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THE REMOVAL OF PELVIC INFLAMMATORY MASSES BY THE ABDOMEN AFTER BISECTION OF THE UTERUS.[1]

By Howard A. Kelly, M. D.

I pointed out but recently (Johns Hopkins Hospital Bulletin, 1900, XI, p. 56, and *Amer. Jour. Obst.*, 1900, XLII, August) the great advantages which accrue from the bisection of the myomatous uterus in an abdominal enucleation in certain complicated cases. I now desire to call your attention to the great value of a somewhat similar procedure in certain cases of pelvic inflammatory diseases.

In most instances of pelvic infections, the ovaries are innocently, only accidently, involved in the inflammatory process, and as a rule one or both of them can be saved even though it is found necessary to sacrifice both uterine tubes. If one ovary is saved, the uterus must also be saved if possible, as by doing this we conserve the function of menstruation as well as that of internal secretion of the ovary.

Where the ovaries are seriously involved in the disease, where they are converted into abscess sacs or into large hematomata, or where they are so densely and intimately matted in with the inflamed tubes that it is useless to attempt to save them, the removal of all the diseased organs together with the uterus is demanded whenever it is possible in this way: by freeing the tube and the ovary on the least adherent side first, and then after tying off the broad ligament and pushing down the bladder, and securing the uterine artery, the most difficult side is easily reached and enucleated, by cutting across the cervix and exposing the opposite uterine vessels and ligating them. The uterus is then pulled up until the round ligament is caught and divided.

[1] An address delivered before The Southern Surg. & Gyn. Assoc., Atlanta, Ga., November 13, 190[illegible].

At this point the operation may follow one of two courses according to the difficulties encountered: in the first place, if, after dividing the uterus and pulling it up, the remaining tube and ovary can be readily enucleated by peeling them out from below upwards by working with the fingers in the lower and anterior part of the pelvis, then the enucleation may be concluded by removing all the structures in one mass. In the second place, if the tube and ovary on the far side are densely adherent and offer any serious difficulties in the enucleation, then I would clamp off the uterus at its cornu and remove it with one tube and ovary, and so leave the more difficult side to be dissected out after emptying the pelvis, securing all the advantages of increased space and light (v. Figs. 1 and 2). I have previously described this method as that of enucleation by a continuous transverse incision from left to right or from right to left.

Fig. 1 shows the method of removing the uterus, in a case of pelvic inflammatory disease, by a continuous transverse incision beginning on the left side.

1 controls the left ovarian vessels.

2 controls the left round ligament; the next step is to free the vesical peritoneum from the uterus and to push the bladder down; this exposes the left uterine vessels which are now controlled by 3.

4 represents the division of the cervix exposing the right uterine vessels controlled by 5.

The division of the cervix is not directly across, a sliver or a snipe (4 to 6), is left in order to clamp the uterine vessels at a higher point.

6 is the ligature on the right round ligament and 7 that on the right ovarian vessels.

It is now my desire to describe a method of enucleation through an abdominal incision which is applicable to a class of cases still more difficult than those just referred to. Let us suppose, for example, a case in which there are *pelvic abscesses on both sides densely adherent to all the surrounding structures*, including the uterus; we will also suppose that the uterus itself is almost or quite buried in a mass of adhesions. In such a case the plan I have just described is scarcely applicable, inasmuch as there is no easier side on which to begin to start the enucleation, for both sides present extreme difficulties.

The method of a continuous transverse incision does actually give us, it is true, a great advantage over the older method of tying down on both sides, for the simple reason that the enucleation of the farther side, wherever we begin, is always easier, even though the difficulties of the first side are just the same by either method.

If, now, I could devise any method by which the enucleation of *both tubes* and *ovaries* in such a case could be effected in a direction from below upwards, it is manifest that a great advantage would be gained.

The vaginal hysterectomists have thus far had a decided advantage over those of us who prefer to operate above the symphysis, in the greater facility with which the adherent structures can be detached when they are attacked in the direction from the pelvic floor upwards. In the method I am now about to describe, this decided advantage is secured

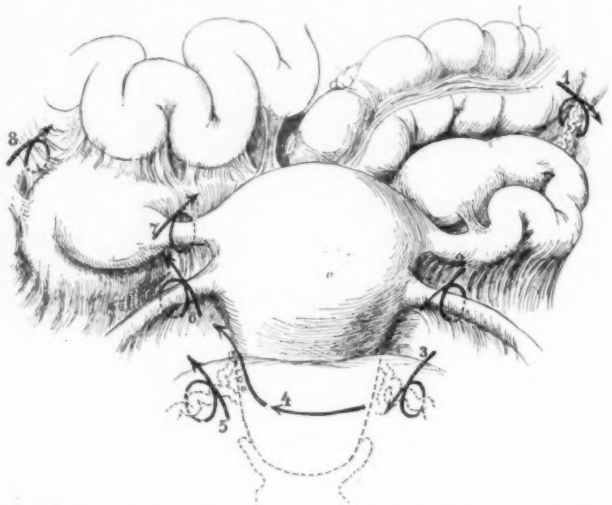

Fig. 2 shows an important modification of the method of enucleation described and shown in Fig. 1. When one side is densely adherent, it is best then to begin the enucleation with the opposite side in the order already described, and then after tying the round ligament at 6.

The next step then is to clamp the cornu uteri and remove the uterus with the tube and ovary of the side on which the enucleation was started.

The final step in the enucleation now is to remove the densely adherent side with forceps and scissors with all the advantages of abundant room and light afforded by the removal of the uterus.

for, and combined with the other great advantages of the abdominal route, that of increased room, and increased facilities of handling, abundant illumination, as well as the detection of various complicating conditions.

The steps are these: If the uterus is buried out of view, the bladder is first separated from the rectum and the fundus uteri found; then, if there are any large abscesses, adherent cysts, or hematomata, they are evacuated by aspiration or by puncture; the rest of the abdominal cavity is then well packed off from the pelvis.

The right and left cornua uteri are each seized by a pair of stout museau forceps and lifted up, the uterus is now incised in the median line in an antero-posterior direction,

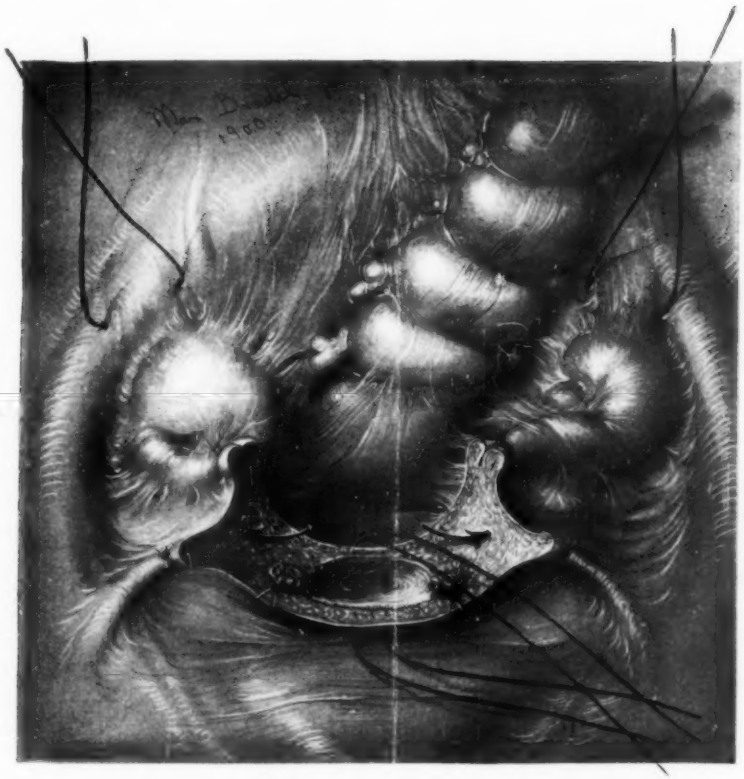

FIG. 3 shows the advantages of a bisection of the uterus enabling the surgeon to remove the uterus before removing either tube and ovary, thus affording all the conveniences of more room, abundant illumination and new avenues of approach indicated by the arrows.

Ligatures may be placed on the ovarian vessels as shown before enucleating the uterine tubes and the ovaries, when the vessels are accessible.

FIG. 4 shows the first step in the bisection of an adherent retroflexed uterus. The forceps catch the anterior face which is opened, then the bladder is pushed down and the cervix divided from side to side as indicated by the arrows.

FIG. 5.—After freeing the cervix from its vaginal end it is held up and the bisection completed as shown here, in a direction from below up.

FIG. 6 shows the bisection completed. Each half of the uterus is now removed by applying ligatures as indicated by the arrows on the round ligaments and the uterine cornua. The lateral inflammatory masses are removed last of all.

and as the uterus is bisected, its cornua are pulled up and drawn apart. With a third pair of forceps the uterus is grasped on one side on its cut surface, as far down in the angle as possible, including both anterior and posterior walls. The museau forceps of the same side is then released and used for grasping the corresponding point on the opposite cut surface, when the remaining museau forceps is removed. In this way two forceps are in constant use at the lowest point. I commonly apply them three or four times in all. As the uterus is pulled up the halves become everted and it is bisected further down into the cervix; if the operator prefers to do a pan-hysterectomy, the bisection is carried all the way down into the vagina. The uterine canal must be followed in the bisection, if necessary using a grooved director to keep it in view. The museau forceps are now made to grasp the uterus well down in the cervical portion, if it is to be a supra-vaginal amputation, and the cervix is divided on one side. As soon as it is severed and the uterine and vaginal ends begin to pull apart, the under surface of the uterine end is caught with a pair of forceps and pulled up and the uterine vessels, which can now be plainly seen, are clamped or tied. As the uterus is pulled still further up, the round ligament is exposed and clamped, then finally a clamp is applied between the cornu of the bisected uterus and the tubo-ovarian mass, and one-half of the uterus is removed. The opposite half of the uterus is also taken away in the same manner.

The pelvis now contains nothing but rectum and bladder, with right and left tubo-ovarian masses plastered to the sides of the pelvis and the broad ligaments, affording abundant room for investigation of their attachments, as well as for deliberate and skillful dissection; the wide exposure of the cellular area over the inferior median and anterior surfaces of the masses, offers the best possible avenue for beginning their detachment and enucleation.

The operator will sometimes find on completing the bisection of the uterus that he can just as well take out each tube and ovary together with its corresponding half of the uterus, reserving for the still more difficult cases, or for a most difficult side, the separate enucleation of the tube and ovary after removal of the uterus.

The operation which I have just described is not recommended to a beginner in surgery; the surgeon who undertakes it must be calm and deliberate, and must bear in mind at each step the anatomical relations of the structures.

The most critical point is the bisection of the cervix and controlling the uterine vessels; if the cervix is slowly and cautiously severed with a steady traction on the uterus under perfect control, there is no danger of seeing the organ suddenly tearing out with rupture of the uterine vessels and frightful hemorrhage. As the divided cervix is pulled apart, the uterine vessels are beautifully exposed and easily caught, only a clumsy operator will plunge his needle or a pair of forceps deep down into the tissues and clamp a ureter. By cutting up the cervix so as to leave a snipe on each side the uterine vessels can be caught at a higher level than that of the division of the cervix.

There is no danger of injuring the bladder, which needs less attention than in any other method of hysterectomy; when the bisection reaches the vesico-uterine fold it may be continued carefully behind this fold well down into the cervix under the bladder which is then easily pushed down as the divided cervix is pulled apart. A simple and a safe way is also to incise the vesico-uterine peritoneum from side to side and push it down with a sponge on a staff and so bare the cervix.

If the uterus is densely adherent to the rectum all the way up to the fundus, a modification of this plan of operating may be followed; the anterior face of the uterus may be bisected and the cervix divided horizontally and the uterine vessels caught, then the rest of the uterus may be carefully divided up its posterior surface in a direction from the cervix towards the fundus. The relations to the rectum are examined as the division is made, and at any point where it seems necessary, a piece of the uterine tissue may be left adherent to the bowel. After the bisection the rest of the enucleation is effected as described above.

I have had abundant opportunity to demonstrate the practical value of this method of treatment in my clinic this year.

In one case (Ward H, 12 April, 1900) the uterus, *tubes and ovaries were so densely adherent* that an effort to free them by the vaginal route failed when I opened the abdomen and caught the uterus by its cornua and bisected it half way down the cervix, and then removed each half uterine body, then with a maximum space under sight and touch the tubes and ovaries were dissected out.

In another instance (W., 5 May, 1900) the entire uterus was bisected and removed and after its removal a large pelvic abscess was extirpated on the right side.

In a case operated upon 7 Nov., 1900 (W., H) the sigmoid on the left and the rectum on the right were the seat of *fistulous openings into the uterine tubes.* Here the fistulæ and other complications did not have to be treated until the uterus was divided and brought out into the surface.

Another patient in my private hospital had *tubercular disease of both tubes* (S., April, 1900), which was extirpated with bisection of the uterus.

In one instance (B., 17 Oct., 1900) there were extensive *hematomata of both ovaries* with dense adhesions and a most difficult enucleation was rendered safe by bisection.

In a case of a large *cancerous right ovary* (B., 19 May, 1900), extending into the pelvic cellular tissue, I found a bisection most helpful in clearing out the pelvis and exposing the disease on its median and under sides, and so making possible a much completer enucleation.

The dangers of the method are those of any novel procedure, and must arise for the most part from want of due attention to the details; for example, one can by reckless cutting divide the uterus obliquely so as to cut directly into the broad ligament among the uterine vessels instead of following the uterine canal and making a true coronal section. Again, rashly cutting, one can divide one-half of the cervix and divide the uterine vessels at the same time with frightful hemorrhage; by clamping the bleeding uterine

vessels in an indiscriminate fashion the ureter may be easily included in the clamp.

I suppose, too, that it is easily possible with sufficient carelessness to cut a hole in the bladder.

The risk of sepsis from opening the uterine cavity is practically nil if gauze is packed in around the uterus; furthermore the study of many of these uteri has shown that the infection rarely ever lingers in its cavity.

The advantages of a bisection and enucleation of the uterus as a preliminary to a complete enucleation of uterine tubes and ovaries for pelvic inflammatory and other diseases by the abdominal route are briefly recapitulated:

1. Additional space for handling adherent adnexæ, afforded by the removal of the uterus.

2. Great increase in facility for dealing with intestinal complications.

3. Better access by new avenues from below and in front to adherent lateral structures.

4. Elevation of structures to or above pelvic brim or even out into the abdomen, bringing them within easy reach of manipulation and dissection.

5. The same advantage in approaching both uterine vessels by cutting from cervix out towards the broad ligaments as is secured in approaching one of them in the continuous transverse incision method.

In general, the time of the operation is shortened; its steps are conducted with greater precision; surrounding structures are far less liable to be injured. In this way there are fewer troubles and sequelæ and the mortality is lessened.

I take it that in intraligamentary tumors of both sides this procedure will prove of the utmost advantage in exposing the tumors at a point low down in the loose cellular tissue of the broad ligament.

I have found since writing this that a similar plan of operating has been advocated by J. L. Faure of Paris.

ABSTRACT.[1]

THE BACTERIOLOGY OF CYSTITIS, PYELITIS AND PYELONEPHRITIS IN WOMEN.

By Thomas R. Brown, M. D.,

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It is only within very recent years that the bacteriological nature of the infections of the urinary tract has been placed upon a firm basis by the work of Rovsing, Melchior, Guyon, Krogius, Schnitzler, Albarran and Hallé and others, and there are still many questions regarding this subject which have not been answered, and various contentions which have not been settled.

The objects of my research have been to determine definitely, as far as lay in my power, the bacterial flora of the infections of the urinary tract in women and to clear up, as far as possible, the moot questions in this subject, to discuss the other factors which may play a part in the etiology of such infections and their relative importance in the development of these conditions, to determine the various modes of entrance of the bacteria into the urinary apparatus, to formulate if possible certain rules regarding the relationship between the species of bacterium found and the clinical picture presented, to suggest from these findings the line of therapy to be carried out, and to note carefully any details in the cases, considered both individually and collectively, that might tend to throw light upon the disputed points of this question or to open up new lines of thought and investigation.

The circumstances attending this investigation were extremely favorable. In the first place, an unusual opportunity was furnished for the study of the etiology of these infections as most of the acute cases were post-operative and were most carefully studied before, during and after the infection; in the second place, a careful cystoscopic examination was made in all the chronic and most of the acute cases, so that no possible mistake could be made in the diagnosis of the bladder infections; in the third place, the urine was obtained directly from the kidneys by ureteral catheterization in all cases of supposed renal infection, and from the urine so obtained the bacteriological, chemical and microscopical investigations were made.

The cystoscopic examinations were made and the ureteral catheterizations were done by Dr. Kelly, whom I wish to thank sincerely for his unfailing kindness in this particular. This work has been carried on during a space of two years and comprises one hundred cases, besides numerous control experiments.

The complete article will be subdivided into the following sections: I. The method of obtaining the urine aseptically; II. The chemical and microscopical examination of the urine; III. The bacteriological study of the urine; IV. The cases of acute cystitis; V. The cases of chronic cystitis; VI. The cases of tuberculous cystitis which have been considered separately for obvious reasons; VII. The cases with symptoms suggestive of cystitis but with no infection; VIII. The cases of acute pyelitis and pyelonephritis; IX. The cases of chronic pyelitis and pyelonephritis; X. The cases of tuberculous pyelitis and pyelonephritis; XI. A review of the bacteriological, chemical and etiological findings in our series; XII. A short resumé of the work of other investi-

[1] The paper in full will appear in Volume X, The Johns Hopkins Hospital Reports.

gators in this field; XIII. Polymorphism and other peculiarities of the micro-organisms met with in our series, with a few observations on the agglutination of the micro-organisms found in cystitis, pyelitis and pyelonephritis by the serum of the patient, and, XIV. A few therapeutic suggestions directly dependent upon the results of the bacteriological and chemical studies. Under section IV will be found a note on bacteriuria, and under section IX some observations on the relation between calculus and infection.

The number of cases in my series is exactly 100, subdivided as follows: cases of acute cystitis, 26; cases of chronic cystitis, 31 (alone 24, associated with pyelitis 7); cases of tuberculous cystitis, 6 (alone 2, associated with renal tuberculosis 4); cases with symptoms suggestive of cystitis but with no infection, 17 (due to urinary hyperacidity 9, due to other causes 8); cases of acute pyelitis and pyelonephritis, 2; cases of chronic pyelitis and pyelonephritis, 12 (alone 4, associated with cystitis 8); cases of tuberculous pyelitis and pyelonephritis, 6 (alone 2, associated with cystitis 4).

It will be obviously impossible in an abstract as short as this to give more than a very brief summary of the most important findings in the various sections mentioned above.

I. The Method of Obtaining the Urine Aseptically from Bladder and Kidney.

The following method was employed for obtaining the urine aseptically: From the *bladder;* the vestibule of the vagina and the mouth of the urethra having been carefully cleansed with bichloride of mercury solution (1:1000) or boracic acid solution (saturated) followed by sterile water, the lips of the urethra are pulled apart by traction on the labia and a sterilized glass catheter with a sterilized rubber cuff, about 10 cm. long, on its distal end is introduced, the operator only touching the rubber cuff at about its middle. After the urine has flowed for a short time (so that if a few micro-organisms from the urethra were introduced, they would be washed out by the first-flowing portion of urine), the rubber cuff is withdrawn by traction on its distal end and 10 to 20 ccm. of urine collected in a sterile tube, the cotton plug of which is only removed during the reception of the urine. In obtaining urine from the *kidney*, the sterilized rubber cuff is placed upon the distal end of the sterilized ureteral catheter, which is introduced through a cystoscope into the ureter, great care being taken that it touches nothing in its course until it is inserted into the ureteral orifice. The bladder should be thoroughly washed out just previous to the procedure if there is the least possibility of a vesical infection being present, while if an infection of the bladder has been definitely determined either by urinary or cystoscopic examination, the ureteral orifice should be carefully swabbed off with a solution of nitrate of silver and the catheter inserted but a short way up the ureter (to prevent any possibility of renal infection from the bladder); as in the case before, the urine should be allowed to flow for a short time before the withdrawal of the rubber cuff and the reception of the urine in the sterile test-tube. Ordinarily the urine flows drop by drop but, in case of pyoureter or hydroureter, or pyonephrosis or hydronephrosis, the urine first flows in a steady stream for a short time until the dilated portion of the ureter or dilated renal pelvis is emptied, when the catheter reaches that portion of the ureteral or renal tract. The adequacy of these methods has been shown by the negative results obtained in 52 control experiments in the case of the bladder and 32 in the case of the kidney.

II. The Chemical and Microscopical Study of the Urine.

After having obtained the urine as described above, it is essential that within a very short time (a few minutes if possible) cultures should be made, as well as a careful chemical and microscopical examination either of this specimen or of a larger quantity obtained by catheter at the same time. The *reaction* of the urine should be carefully tested, as by its acidity, neutrality or alkalinity it tells us in a broad way something regarding the nature of the microbe causing the infection. In cases with symptoms of cystitis but with no infection, it is important to determine also the degree of the acidity, which has been done in our cases by titration with a 1-10 normal solution of sodium hydroxide, phenolphthalein being used as the indicator, for, as we shall see later on, urinary hyperacidity may definitely cause symptoms which may easily be mistaken for those of cystitis.

The *specific gravity* of the urine is of importance because of the frequency of low specific gravities in cases of pyelonephritis and also in cases of hysteria and the various neuroses, and its determination is of especial interest when both kidneys are catheterized, as well as the quantitative determination of the *urea*-output from either kidney, so that we may determine the secretory function of each—a question of immense importance when nephrectomy is under consideration.

The determination of the quantity of *albumin* present is of great importance because, combined with a careful cystoscopic examination and a determination of the grade of pyuria and hematuria, it furnishes a valuable criterion for the differentiation between renal and vesical infections, which is of especial value in the hands of those to whom ureteral catheterization is impossible. Of course the urine must be examined shortly after its withdrawal, and considerable experience must have been had in this mode of diagnosis; but, if these requisites have been fulfilled, one may definitely conclude that if the grade of pyuria is decidedly more marked than the grade of albuminuria, cystitis is probably present alone; while, if there is considerable disproportion in the other direction, it speaks for a renal infection, alone or associated with a cystitis. If a person had a chronic nephritis before the development and during the course of the cystitis, the diagnosis would be rendered more difficult, although the presence of casts in this last condition would call our attention to this source of error. Obviously, however, the only absolutely satisfactory method to be employed is catheterization of the ureters combined with a careful cystoscopic examination.

The *microscopical examination* is of value because it tells us of the absence or presence of vesical, ureteral and renal epithelial cells; it calls our attention to the crenation or lack of crenation of the red and white blood-cells (the former of which conditions speaks for a renal hematuria or pyuria if the grade of these conditions is low—if the pyuria or hematuria is of high grade this method of differentiation is of very little value); and it tells us of the morphology, number and motility of the micro-organisms giving rise to the infection. By counting the red and white blood-cells in a definite quantity of mixed urine (1 cmm.) with the Thoma hematocytometer we can definitely determine the success or failure of the mode of treatment employed.

III. The Bacteriological Study of the Urine.

The methods of making the cultures and identifying the bacteria found are those usually in vogue, two or three loops of urine or of diluted urine being first plated on agar-agar from which transplantations can be made on the various media. The bacilli should also be counted on the plates so that, by studying the cultures taken from the urine from time to time, the success or failure of the method of treatment employed may be definitely determined.

In all cases, except perhaps acute post-operative cases, the *tubercle bacilli* should be carefully searched for in the sediment, while if there is pyuria or hematuria in an acid urine but with no growth on the ordinary media, intraperitoneal injections into guinea-pigs should also be employed.

In any specimen where the history of the case or the microscopical examination of the sediment makes us suspect the presence of the *gonococcus*, this micro-organism should be sought for by the use of special media and of special staining reactions.

Infections of the Bladder.

In our series of cases we have divided the cases of cystitis into acute, chronic and tuberculous, and then subdivided these groups along bacteriological lines. We have considered those cases as acute in which the infection has been present but a short time, where there is no *real* contraction of the bladder and where there are no distinct areas of ulceration, while in the chronic cases the duration has been longer, there is practically always more or less ulceration, and the bladder is distinctly and usually markedly contracted.

IV. Cases of Acute Cystitis.

These cases are of especial interest because of the fact that, as all but two of the 26 cases studied were post-operative infections, in which the urine had been carefully examined immediately preceding the operation, they furnish us with absolute criteria as to the micro-organisms bringing about the infection and the other etiological factors involved.

In all these cases the micro-organism causing the infection was present in pure culture and generally in large number; in practically all of the cases two and in the rarer ones three or more cultures were made, and in the post-operative cases a culture was always taken after the disappearance of symptoms; in all these 24 cases the infection entirely disappeared under treatment. The urine in all these acute infections contained varying numbers of pus-cells, red blood-cells and vesical epithelial cells.

The bacteria found in these 26 cases were: B. coli communis 15 times, or 57.7 per cent; staphylococcus pyogenes albus 5 times, or 19.2 per cent; staphylococcus pyogenes aureus twice, or 7.7 per cent, and B. pyocyaneus, B. typhosus and B. proteus vulgaris (of Hauser) once each, or 3.8 per cent, while in one case, microscopically, a colon bacillus was found, although the cultures were not completed.

In all the cases except one—that due to B. proteus vulgaris (where the urine was ammoniacal)—the urine was acid, although the degree of acidity varied markedly with the variety of micro-organism, being usually increased in the case of the colon bacillus and typhoid bacillus infections, and diminished in the case of the staphylococcus infections, especially in the case of staphylococcus pyogenes aureus, where the urine was sometimes neutral in reaction. Especially striking is the prevalence of the colon bacillus and the absolute proof that this micro-organism can by itself give rise to vesical infections as furnished by these studies, while the infections due to the pyocyaneus and typhoid bacilli are of great interest, because of their extreme rarity. These last two cases are reported in full elsewhere (*Maryland Medical Journal*, 1900, May; *Medical Record*, 1900, March 10).

The time of the development of the symptoms varied between the 3d and the 20th days after the operation, being shorter in the cases of B. proteus, St. pyogenes aureus and some of the infections with B. coli communis. Apparently the more virulent the micro-organism and the more severe the symptoms, the earlier after the operation the infection manifested itself.

The mode of entrance of the bacteria into the bladder in the majority of these cases was undoubtedly from the urethra by catheterization, although this procedure was performed with extreme care, which is not at all remarkable when we consider Melchior's, Savor's, Gawrowsky's, Bouchard and Charrin's researches upon the bacterial flora of the normal urethra and vulva, colon bacilli and various staphylococci being frequently found.

In some cases, however, infection seemed to have taken place definitely from the rectum or from some focus of infection either by means of the blood or lymph currents or by direct transmission.

We were, however, at once struck in considering our cases of acute cystitis by the fact that *other accessory etiological factors* seemed to be absolutely necessary for the production of the infection in the great majority of these cases, which, so to speak, prepared the bladder for the reception of these germs and rendered it susceptible to their usually low pathogenic power.

The most important of these factors, as evidenced by our series, were anemia and malnutrition, constant pressure on the bladder by other organs or by new growths, sagging of the bladder due to relaxation of the perineum, trauma to

the bladder either due to the operation or to the catheterization (these are undoubtedly the most important of these accessory factors, as evidenced by the fact that in almost all the cases of post-operative cystitis the nature of the operation was such that considerable trauma of the bladder was inevitable), the trauma and congestion of the bladder incidental to child-birth, catheterization with poor technique, and a contiguous focus of infection (a large appendicular abscess in one of our cases). In the case of the urea-splitting micro-organisms (B. proteus vulgaris), the presence of the bacteria plus the irritation of the ammoniacal urine seems sufficient to bring about a cystitis.

No examples of true vesical *bacteriuria* were met with in our cases, but in a few there was seen a condition nearly approaching this, *i. e.* enormous numbers of bacteria but very few pus-cells in the urine.

V. Cases of Chronic Cystitis (non-tuberculous).

The cases varied markedly in duration and in severity; in some cases the symptoms were comparatively slight, in other cases so severe as to render life practically unbearable. Thirty-one cases in all were studied, in 24 of which cystitis alone was present while in 7 a pyelitis was associated with the cystitis. In 3 of these latter cases the pyelitis had preceded the cystitis and in 4 the reverse had taken place; in all the first 3 the vesical symptoms were very slight. In this series of 31 cases B. coli communis was met with 16 times, or 55.2 per cent (15 times in pure culture, once in association with the tubercle bacillus); St. pyogenes aureus 3 times, or 10.3 per cent; St. pyogenes albus twice, or 6.9 per cent; a slowly liquefying (gelatin) urea-decomposing white staphylococcus 4 times, or 13.8 per cent, and B. proteus vulgaris once, or 3.4 per cent. With the exception of the one case mentioned (B. coli and B. tuberculosi), the micro-organisms were always present in pure culture. Of the 31 cases, the urine was acid in 26 (occasionally neutral or exceptionally slightly alkaline in some of the staphylococcus infections), alkaline or ammoniacal in 5 (B. proteus vulgaris, slowly-liquefying urea-decomposing white staphylococcus), although in some of these latter cases, when the bladder infection is very slight and the renal infection marked, the urine may be neutral or even acid.

The common *modes of infection* seemed to have been from the vulva or urethra usually by catheterization, from the rectum, from the kidney, from poor technique in examining or treating the bladder. The *other factors in the etiology* of the condition were practically the same as in our series of cases of acute cystitis; a new accessory etiological factor is to be found in this series in operations upon the urethra.

VI. Tuberculous Cystitis.

Six cases of tuberculous cystitis were met with in our series. In one case and possibly in another, the cystitis occurred alone; in the other cases it was associated with a tuberculous pyelitis or pyelonephritis. Five of the cases were chronic; one was comparatively acute. The constitutional symptoms and the vesical lesions were marked in all these cases but one. In all, tubercle bacilli were found, usually in small numbers, occasionally in comparatively large numbers. They were present in pure culture in all but one case, where the colon bacillus was also present (secondary infection after a suprapubic cystotomy). The urine was always markedly acid and contained usually a large number of pus and red blood-cells, the latter being comparatively more frequent than in the other cases of chronic cystitis. The *mode of entrance* of the bacilli was difficult to determine; the bladder seemed to be affected first, probably by metastasis from some tuberculous focus elsewhere in the body. *Other etiological factors* were difficult to determine; only one case gave a family history of tuberculosis and only one showed a pulmonary lesion; in some cases weakness, anemia and malnutrition seemed to have rendered the bladder susceptible to the infection. In some cases the onset was gradual and insidious, in other cases the symptoms of onset were those of a typical acute cystitis.

VII. Cases with Symptoms of Cystitis but with no Infection.

Besides the increased frequency of urination, burning sensation, etc., seen after the use of various drugs and in certain neurotic conditions, we have met with two classes of cases with symptoms of cystitis but with no infection. The first class is of especial interest, the symptoms being due to *urinary hyperacidity*, which was determined by titrating 10 ccm. of freshly drawn urine with one-tenth normal sodium hydroxide solution, phenol-phthalein being used as the indicator. Nine such cases were met with and the acidity of the urine varied from twice to five times the normal. The urine always contained a few and in the more severe cases a moderate number of pus and red blood-cells, while cystoscopic examination usually revealed a markedly ingested trigonum. The condition seems to be one of the manifestations of a general neurosis which requires general as well as local treatment, the latter of which consists mainly in the neutralization of the intense acidity of the urine by the administration of alkalis by mouth. Cultures of the urine were always negative and the condition, so far as I know, has not definitely been described previously. The condition is of especial importance because, if misinterpreted, local applications, irrigations, etc., are frequently inaugurated which, in the hands of all but the most careful and skillful, frequently lead to vesical infections.

Eight cases with symptoms of cystitis but with no infection are reported due to other causes; such causes are relaxation of the vaginal outlet, especially if marked anteriorly, retroflexed uterus, pelvic inflammatory disease with vesical adhesions, large pelvic neoplasms pressing upon the bladder, mucous polypi protruding from the vagina, and varicosity of the vesical veins. If the pathological condition is corrected by operation, the vesical symptoms shortly disappear.

Pyelitis and Pyelonephritis.

These studies are unique in that the urine from which they have been made was obtained directly from the kidney by

ureteral catheterization. Both kidneys were usually catheterized, so that the two sides could be compared—a most important point in determining upon the advisability or non-advisability of nephrectomy.

VIII. Acute Pyelitis and Pyelonephritis.

Only two cases were met with, in both of which the renal infection was secondary to the bladder infection. One was due to B. coli communis and the urine was acid; the other was due to B. proteus vulgaris, and the urine was alkaline. In either case the other kidney was perfectly normal. It was interesting to note that in one of these cases the affected kidney was the one suspended at the operation.

IX. Chronic Pyelitis and Pyelonephritis (non-tuberculous).

Twelve cases of this condition were studied, in 4 of which the pyelitis was present alone, in 8 associated with cystitis. Catheterization of both kidneys showed that the infection was unilateral in all but one case. The symptoms were very variable, being sometimes almost nil, sometimes very severe. The urine from the infected kidney was usually pale, of less specific gravity, increased in amount, low in urea percentage and contained a greater or less number of pus-cells, some red blood-cells and ureteral or renal epithelial cells. The bacteria found in these 12 cases were: B. coli communis 6 times, or 50 per cent; B. proteus vulgaris 3 times, or 25 per cent; the slowly-liquefying, urea-decomposing white staphylococcus twice, or 16.7 per cent, while in one case there was no growth, the infection evidently having died out. The urine was acid in the colon bacillus cases, alkaline in the cases due to the other micro-organisms. As to the *mode* of infection, in 5 the bladder was infected first and the kidney secondarily, evidently by an ascending ureteral infection, while in 5 and probably in one other the kidney was infected first; that is, the infection was probably carried directly to the kidney by means of the blood or lymph currents; in one case the infection was an ascending ureteral infection, there being a uretero-vaginal fistula.

An interesting point regarding the *relation between infection and calculus formation* was to be made out from a study of these cases. In all 5 cases of chronic pyelitis, where the urine was alkaline due to a urea-decomposing micro-organism, a renal calculus composed of phosphates and carbonates of calcium and magnesium was found, while from the centre of one of the calculi a pure culture of the micro-organism causing the pyelitis was obtained.

X. The Cases of Tuberculous Pyelitis and Pyelonephritis.

Six cases of this nature were met with, in 2 of which the renal infection occurred alone, while in the other 4 a vesical infection was associated with it. One of the cases was an acute infection, while 5 were chronic. All cases were pure infections and in all 6 the tubercle bacilli were found in the urine. The urine was always acid, contained considerable albumin, many pus-cells, more red blood-cells than seen in the other forms of pyelitis, and renal and ureteral epithelial cells. None of the 6 cases gave a tuberculous family history and only one showed a tuberculous lesion outside the urinary tract. In 4 of the cases the kidney seemed to have become infected from the bladder by an ascending ureteral infection.

In the complete article, section XI is devoted to a general consideration of the results obtained, and section XII to a discussion of the bacteriological results obtained by other observers.

Section XIII treats (1) of the polymorphism of various bacteria, especially as regards variation in cultural peculiarities, motility and virulence of the colon bacilli and the chromogenic properties of the staphylococci, and (2) of the agglutination of the bacteria by the patient's serum in cystitis and pyelitis, a positive reaction being obtained in 2 of the 3 cases tested.

Section XIV deals with a few therapeutic suggestions directly dependent upon the bacteriological findings, the question of treatment not being further discussed in this article, as it obviously belongs more to the surgeon than to the bacteriologist. To render the urine a poorer medium for the growth of bacteria and to help to wash out the bacteria, pus-cells, etc., present, large quantities of water should be administered, preferably by mouth, but if this is not feasible, by rectal enemata or by subcutaneous injections. The administration of substances which render the urine somewhat antiseptic, as urotropin, cystogen, salol, etc., is advisable, especially in the acute cases. Also in cases associated with an alkaline urine, acids such as boracic, benzoic or camphoric acids should be given by mouth in sufficient quantity to render the urine acid, while in the acid infections alkalis should be given until the urine is alkaline, as it would seem probable that by these means we diminish the growth of the respective micro-organisms by furnishing a less favorable medium. The same condition of inhibition of growth would probably be brought about in any case by the administration of a great excess of either acid or alkali. It is essential that the resisting power of the patient be increased as far as possible by a careful attention to all questions of personal hygiene, the insistence upon plenty of fresh air, sunshine and good food, the removal of depressing or very exciting influences, the attention to any disorders of the blood, the circulatory and respiratory organs or the organs of digestion and elimination if such conditions are present. Of course, in many cases other measures besides the ones just mentioned have to be employed, such as topical treatment, irrigations, instillations (nitrate of silver has proven of most value to us in these connections), operative treatment of various kinds, etc., and the above are but the suggestions regarding the general medical treatment of cases of cystitis, pyelitis and pyelonephritis derived directly from the bacteriological study of the cases.

Discussion.

Dr. Young.—I have enjoyed this paper and I think Dr. Brown is to be congratulated for his excellent work. My

interest in this subject has extended over several years, as I have been working, particularly on male subjects, during that time along the same line. In looking over the results obtained I was struck by the great dissimilarity of the organisms we have found. My work includes, I think, three or four times as many organisms as have been found in the cases studied among the females. For instance, among others I found all forms of the proteus, the streptococcus, the staphylococcus albus and the aureus, the bacillus lactis aërogenes, and, several times, the gonococcus.

Another discrepancy between our results is that the colon bacillus, which occurred in the great majority of cases in the female, was not so often found in the male. The staphylococcus pyogenes albus in my cases was found to be a much more common cause in the male of acute or chronic cystitis and nephritis.

One particularly interesting point in the paper is in regard to the effect of these bacteria upon the urine, as Dr. Brown has mentioned. For instance, in my cases with a pure colon bacillus infection there was always an acid reaction, while with the proteus there was a marked alkaline or ammoniacal reaction. If both were present in the same case there was usually only a slight alkalinity, the acid-forming colon bacillus apparently neutralizing more or less completely the alkalinizing effect of the proteus group. In one case I was able to prognosticate the presence of these two organisms simply upon the finding of a very slightly alkaline urine with the presence of large numbers of bacilli—enough to have made it strongly acid if colon alone were present, and very alkaline if proteus were the sole organism.

We have encountered a number of staphylococci that could not exactly be classified; in fact, there were all grades of staphylococci in the cultures I have examined, some requiring 15 days to liquefy gelatin and some that did not liquefy it at all, and I suspect that Dr. Brown's staphylococci belong to the group that Melchior has called the diplococcus ureæ non-liquefaciens.

As to the amount of albumin in making a diagnosis of pyelitis from cystitis, I think from practical experience it is often pretty difficult to determine. Finger, discussing the question of infection of the pelvis of the kidney after gonorrhœa, says that if the albumin has reached 1.5 per cent you can generally safely consider that the pelvis of the kidney is involved, but we have noticed in examinations of the urine in cases of cystitis the amount of albumin varied very greatly, sometimes being present in considerable amount, sometimes entirely absent, with similar amounts of pus present.

Dr. Brown's case of typhoid infection of the bladder is certainly a very interesting one. In the first place, the organism was introduced from without; and, secondly, it is the only case I believe in which a careful cystoscopic study has been made in an acute cystitis due to the bacillus typhosus. The symptoms in his case were very severe and differ in that respect from the usual cystitides following typhoid fever. In a great majority of cases in which the bacillus appears in urine after typhoid fever there is no irritation at all. It seems to be the fact that infection of the bladder by the typhoid bacillus is a very mild one in most cases, but I have recently had a case of severe chronic cystitis, with marked ulceration of the mucosa, in which the bacillus typhosus was the sole infecting bacterium, and that seven years after the attack of typhoid fever.

In all the cases infected with the proteus I have had the urine has been strongly alkaline, but we have recently had one case in the hospital that had an acid reaction, and a study of the organism by Dr. Sabin showed it to be the proteus Zenkeri, which is not as pronounced in its effect upon media and is not an alkalinizer; if inoculated into sterile urine it renders it acid. This is interesting in that bacteriologists, I believe, consider all the proteus organisms to belong to one group and to be interchangeable.

Gonococcus infections of the bladder were not present in Dr. Brown's cases, and I believe they are much more common in the male, owing to the greater severity of the urethral inflammation in the latter. Thus I have found this organism six times in the bladder, in three acute and three chronic cases of cystitis. The only other cases in the literature, however, where cultivations of the gonococcus were obtained, were in the female, the difficulty of obtaining cultures from the bladder of the male in acute gonorrhœal infections being the probable cause. This was overcome in my cases by aspiration of the bladder above the symphysis.

The demonstration of the case with which the bladder may be aspirated for cultures will probably soon increase the present limited number of observations on the ability of the gonococcus to invade the bladder.

DR. WELCH.—There are only one or two points which I shall undertake to discuss in Dr. Brown's very interesting and important paper. I am impressed by the fact that both Dr. Brown and Dr. Young find that bacteria which have ordinarily very limited pathogenic activity and do little harm elsewhere in the body are so often concerned in cystitis and pyelitis. This is the more remarkable as it has been demonstrated that the healthy bladder is capable of disposing of large numbers of much more virulent kinds of bacteria. The The slowly-liquefying and the non-liquefying white staphylococci we are accustomed to regard as among the least pathogenic pyogenic cocci, and still these are apparently often present in the urine in cystitis and are interpreted as the exciting factors in the causation. This should in my opinion lead us to attach much importance to various accessory causes which render the urinary passages incapable of resisting even these mildly pathogenic bacteria, and it would be a one-sided view which failed to take into consideration in the etiology of cystitis and pyelitis the non-bacterial factors.

The question has been raised as to the identity of the non-liquefying white staphylococcus. I should like to inquire whether the coccus in question may not be Staphylococcus cereus albus. There is every gradation among the pyogenic staphylococci as regards such properties as rapidity

and intensity and tint of color-production, liquefaction of gelatin, coagulation of milk and virulence when tested on animals, so that there is much in favor of the view that they are varieties of a common species. We have been in the habit of designating as Staphylococcus epidermidis albus the slowly liquefying and slowly coagulating white staphylococcus, which, moreover, is of limited virulence and, as has been abundantly demonstrated, is a regular inhabitant of the human epidermis. I should infer from Dr. Brown's description that this Staphylococcus epidermidis albus has been often encountered by him in cases of cystitis.

DR. HUNNER.—I have been struck with the apparent non-relationship between the degree of bladder disease and the infecting organism which under other conditions is often very virulent. Especially is this true in my experience with the streptococcus.

We had a case in Dr. Kelly's service last fall who was the wife of a physician and had been under careful observation. Eight weeks before admission her first sign or symptom of disease appeared in the form of a marked hematuria, the urine being of a claret color and occasionally containing small bright red clots. After three weeks she became anemic, had occasional pains in the right kidney region, and experienced some headache, giddiness, and nausea. There had been no elevation of temperature until two weeks before admission, when she was suddenly taken with a severe shaking chill which lasted one and one-half hours and was followed by a rise of temperature to 104.3° F., violent headache, pains in the legs, retching, vomiting, and great restlessness. The temperature gradually subsided but had reached 100° every afternoon since. The urine was found to contain great numbers of streptococci in pure culture, and a catheterized specimen from the right kidney showed infection by the same organism. Nephrectomy was done and a small stone was found in one calyx with multiple foci of necrosis scattered throughout the kidney. The bladder mucosa seemed entirely healthy.

A patient was admitted this spring who had suffered with symptoms of stone in one kidney for the past two years, and in both kidneys for three months past. Streptococci were obtained in pure culture from the bladder and from either kidney, but the bladder mucosa showed no lesion. Wax-tipped bougies were scratched by stone in either kidney.

A case came in a day or two ago and from her history stone in the right kidney was suspected. On catheterization of the bladder macroscopically, clear urine was obtained. Cystoscopy revealed a healthy-looking bladder. I catheterized the right kidney with a wax-tipped bougie and obtained scratch-marks from stone. On examination of my plates to-day I was surprised to find a pure growth of streptococcus both from the bladder and the right kidney.

DR. BROWN.—I would like to say that one of the probable reasons why the bacterial flora in my cases is not so large as in Dr. Young's experience is that my cases were taken entirely from private patients where the chances of infection are decidedly less.

In regard to the disputed staphylococcus, I thought, of course, that it possibly was identical with the diplococcus of Melchior but could not convince myself of it, as it certainly showed no especial tendency to assume the diplococcal arrangement.

As I have stated before, the infections were almost always confined to those cases in which the resistance was very low, or the traumatism of the bladder was marked.

I have not attempted to carefully differentiate the various white staphylococci found in these cases, for it seems almost impossible to satisfactorily separate these micro-organisms into especial groups, as all gradations in cultural peculiarities were met with. As Dr. Welch has stated, some of them certainly could be best considered as Staphylococci epidermidis albi.

THE INTRINSIC BLOOD-VESSELS OF THE KIDNEY AND THEIR SIGNIFICANCE IN NEPHROTOMY.

BY MAX BRÖDEL.

[PRELIMINARY COMMUNICATION.[1]]

In view of the enormous number of investigations of the different structures of the kidney recorded in the literature it seems strange that only scanty information exists on the actual course of the larger blood-vessels and their relation to the pelvis of the kidney. The normal and abnormal arrangement of the vessels at the hilum are well known and the microscopical pictures of the vessels in the cortex and pyramids are likewise thoroughly familiar to every student. But as to the actual form of the pelvis and the course and distribution of the larger vessels around its walls very vague ideas still prevail. It is evident that exact knowledge of the anatomy of this region would prove of the utmost im-

[1] Since this article was sent to press, I learned that Dr. William Keiller, of Galveston, Texas, has been following a similar line of research. His findings were embodied in a report to the Texas State Med. Soc., in whose Transactions for 1900 they appear. I have just received through the kindness of Dr. Keiller some of his specimens which substantiate many of the points brought forth in this paper, although the methods he employed differed essentially from mine. This being merely a preliminary communication precludes the possibility of discussing in detail Dr. Keiller's excellent work.

portance to the surgeon in enabling him to open the pelvis of the kidney without running the risk of cutting large branches of the renal artery.

In order to study this region I made a large number (40) of celloidin injections of human kidneys. The injected specimens were then digested[2] and the casts thus obtained, examined. Nearly thirty additional injected kidneys were not digested, but were cut into sections in various planes in order to control the results obtained by the method of digestion. Some of these sections were rendered translucent by the usual methods.

I made separate injections of the arteries, of the venous system and of the pelvis, combinations of any two out of three and finally triple injections. The great majority were of the last class. At first I confined my injections to kidneys which seemed normal so far as regarded form and size; later, after I had, in this way, determined the law according to which the vessels were grouped, I concentrated my attention upon abnormally shaped kidneys. The present paper will contain a short abstract of the main results of these studies. I shall confine myself to the description of the normal form and mention briefly only a few variations. A more elaborate communication will appear later.

The Pelvis of the Kidney.—From a surgical standpoint all forms of pelves may be classified under two main groups.

(1) True pelves with major and minor calices.

(2) Divided pelves, where there is no free communication possible between all of the calices inside of the kidney.

(1) *True Pelves.*—Fig. 1 shows the ideal form of a true pelvis. There are eight calices; the uppermost (1) and lowest (8) of which may have double papillæ. The remaining six calices stand upon the pelvis in a double row; an anterior, irregularly arranged (2, 4, 6) and a posterior, more regular, row (3, 5, 7).

The horizontal axis of the pelvis (Fig. 1 D, *a*, *a'*) runs from the posterior surface of the kidney obliquely through the organ to the outer third of its anterior surface and the two rows of calices leave this axis at almost equal angles. The posterior calices, therefore, point to a line just a little posterior to the lateral convex border of the kidney (*b*), while the anterior calices are directed straight forward into the convex anterior region of the organ (*c*). This form of the pelvis is, next to the distended pelvis, the most favorable for a surgical incision.

[2] I employed Schieferdecker's corrosion-method, slightly modified by Mixter and Mall. The procedure was as follows: The vessels and pelvis of the kidney were thoroughly washed out and then dehydrated with alcohol and ether. The arteries, veins and pelvis were then injected with cinnabar, Prussian blue and arsenic preparations of an alcohol and ether solution of celloidin, respectively. The kidney was then placed in a digesting fluid consisting of varying amounts of 1:3000 pepsin (Sharp & Dohme) dissolved in 0.3 per cent to 0.5 per cent of HCl. The process of digestion was completed in from three or four days to two weeks. When the substantia propria and the connective tissue of the kidney were completely dissolved, they were washed out with a gentle stream of water, leaving only the casts of the injected vessels and pelvis. The casts were preserved in glycerin to which a few drops of carbolic acid were added.

The great majority of pelves have well defined major calices, with a very narrow lumen, and owing to this condition it is often impossible to gain access to the minor calices and remote pockets through a surgical incision into the pelvis at the site of the hilum. Furthermore, this incision must be short, as there is a constant branch of the renal artery running downward over the posterior surface of the pelvis at the hilum.

The varieties of the ideal form are very numerous and will be described in detail in the fuller communication above referred to. All kidneys with a true pelvis have a smooth surface or moderate degree of lobulation, regular outline and, as a rule, a normal blood-supply.

(2) *Divided Pelves.*—Fig. 2 shows the typical form of a divided pelvis. Comparing it with Fig. 1 one finds that between calices 2, 3 and 4, 5 there is a zone of cortical substance (*a*), which extends to the hilum. It divides the upper part of the pelvis from the lower, and in the majority of cases the lower portion receives the greater number of calices. Although the number of calices in divided pelves may be eight, they are generally more numerous. In other respects the topography of these pelves is similar to that of the true pelves. A kidney with a divided pelvis, as a rule, preserves its fœtal lobulations and has an abnormal arterial circulation; the division between the individual sections of the pelvis is generally marked on the surface by an especially deep groove, thus causing the appearance as though there were two separate kidneys, one on top of the other. Frequently they are indeed separate organs as far as their secretory function and their arterial circulation are concerned. The veins, however, collect, as a rule, in one single trunk. These conditions are readily understood by one who is familiar with the different stages of the development of the kidney, with its origin, its ascent from the pelvis to the lumbar region and finally the wandering in of the vessels.

The Renal Artery.—The renal artery divides at the hilum, as a rule, into four to five branches, the distribution of which, in relation to the pelvis, is such that three-fourths of the blood-supply is carried anteriorly, while one-fourth runs posteriorly. The relative size of the two systems may occasionally be $\frac{4}{5} : \frac{1}{5}$, $\frac{3}{4} : \frac{1}{4}$, but rarely $\frac{1}{2} : \frac{1}{2}$. The arteries are end-arteries in the strictest sense of the word and the branches of the anterior division never cross over to the posterior side, or *vice versa*. They do not anastomose with each other.[3] The plane of division between the two arterial trees is indicated by the axes of the posterior row of calices (see Fig. 1 D *b* and Fig. 3 B arrow).

Fig. 3 B demonstrates this in a schematic way. The sec-

[3] To Hyrtl apparently is due the credit of having first mentioned the "natürliche Theilbarkeit der Niere," by which he means that in a corrosive specimen the two arterial systems are completely separated by the pelvis. He also affirms that this arrangement of the renal arteries is found "without exception in all mammalia from the whale to man." [Hyrtl, Topographische Anatomie. Wien, 1882. Bd. I, pg. 834.] Hyrtl's statement has unfortunately been overlooked and up to this date the text-books on anatomy and surgery make no mention of this anatomical fact, so important to the surgeon.

tion is imagined as passing transversely through the middle of the kidney, as in the lower diagram in Fig. 1. The artery (*a*) sends a large branch (*a'*) anteriorly and a small branch (*a''*) posteriorly. Both branches are seen running close to the pelvis and the calices up to the region of the papillæ, whence they send off fan-like branches (*b*) around the pyramids. The anterior branch (*a'*) supplies the whole of the anterior pyramid (P) and the anterior portion of the posterior pyramid (P'), while the posterior branch (*a''*) supplies only the remaining portion of the posterior pyramid (P'). The arrow indicates the division between the two vascular trees. *c* represents a section of the long lateral column of cortical substance, which is situated between the anterior and posterior rows of pyramids P and P'.

The greater part of the arterial circulation of the kidney follows this system. The entire region from calices 2 to 7 has this arrangement. Around the uppermost (1) and lowest (8) calyx, however, the arteries have a somewhat different arrangement (Fig. 4). They are derived from the anterior group of vessels and run either as a single trunk, having a diameter of 2-3 mm., to the base of the major calyx, or divide before they reach the calyx into three branches, I, II, III. Branch I and branch III run courses similar to those of branches *a'* and *a''* in Fig. 3 B, *i. e.* anteriorly and posteriorly to the calyx. It is obvious that their arrangement must prolong the arterial division, existing in the central portion of the kidney, upward and downward. Branch II may be short, as in Fig. 3 A (upper pole), and vessels coming from branches I and III partially may take its place. Or it may be of considerable length, as in Fig. 5, where it makes a long sweep around the inner border of the pole. Branch II is the one that generally plays the rôle of the supernumerary artery; it may arise from the renal artery near its aortic origin (Fig. 5 *a* and *b*) or even from the aorta (Fig. 5 *c*); in the latter case it must be considered a supernumerary artery.

Although separate arteries are found in kidneys with smooth surfaces, they are much more frequently met with in those that have preserved their fœtal lobulation. This abnormal arrangement of the arteries is, perhaps, the cause of the persistence of the lobulated form. When he meets with a kidney having a distinctly lobulated form, the operator may expect to find a long hilum with separate arteries and an abnormal renal pelvis.

The further course of the arteries, the irregularities that may occur and to what extent they affect the above described schema, will be dealt with in a fuller communication.

The Renal Vein.—Concerning the veins, I shall here record only a few notes dealing with their more important characteristics.

While there is a complete arterial division in the plane connecting the posterior calices and terminating in the lateral half of the upper and lower calices, the veins follow quite a different arrangement. Around the bases of the pyramids they anastomose and form the familiar venous arches. They unite in large branches that run between the sides of the pyramids and the columns of Bertini to the necks of the calices, where they lie between the pyramid and the arterial branches. The thickness of these collecting veins accounts for the peculiar lobulated appearance of the base and sides of the pyramids (Fig. 6 B). Around the necks of the calices, both anteriorly and posteriorly, these veins form a second system of anastomoses (Fig. 6 B *b*) much shorter and thicker than that at the base of the pyramids (*a*). This appears as a number of thick loops or rings which fit like a collar around the necks of the calices. Nearly all the collected blood of the posterior region is carried anteriorly through these short thick stems, to join that of the anterior portion at the point indicated by *c*.

In comparing Figs. 3 and 6 one finds that an incision through the posterior row of calices would avoid all the arteries but would sever six of these collecting veins. As there remain, however, sufficient anastomoses at the upper and lower pole of the kidney, no serious consequence should follow an injury to these veins. The large veins at the hilum are generally described as being in front of the artery. This is, however, only the case in the neighborhood of the vena cava, while at the hilum and throughout the entire kidney the veins are usually situated between the arteries and the pelvis.

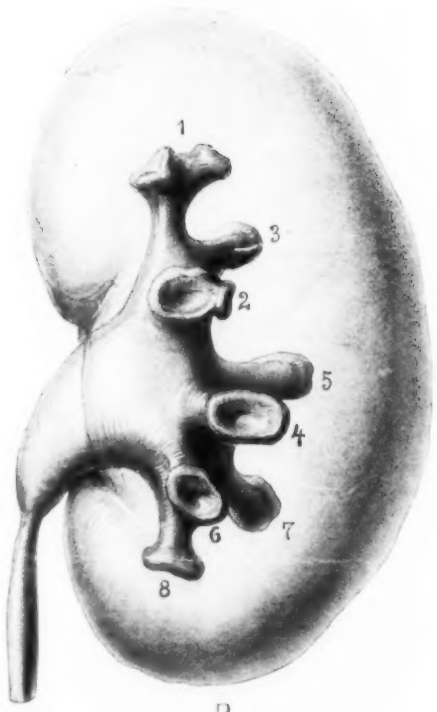
The Surface of the Kidney and its Relation to the Underlying Structures.—If one is thoroughly familiar with the kidney's surface it is a comparatively easy matter to determine the arrangement of the underlying structures; one can map out fairly accurately the position of the pyramids, of the columns of Bertini and of the calices; and as a consequence the position of the plane of arterial division can also be determined. Let us consider briefly the principal landmarks.

The anterior surface (Fig. 7 B) of a normally shaped kidney is convex and has its greatest prominence at the lower portion at the point indicated by *a*. The posterior surface (A) is somewhat flattened. A lateral view of the organ (C) shows this very clearly; there is also rendered visible a depression(*b b'*), which indicates the position of the lateral column above referred to, or the line of division between the anterior and posterior rows of pyramids. This depression, however, by no means indicates the division between the arterial systems, as below it is situated the greatest number of large vessels contained in the kidney. This line (*b b'*) is therefore a most important landmark and in every nephrotomy should be thoroughly mapped out. The other depressions on the surface indicate the positions of the margins of the individual pyramids or subdivisions of such.

Fig. 8 shows the same kidney as Fig. 7, with its pyramids and calices schematically drawn. The posterior pyramids (A 3, 5, 7) are long and slender, while the anterior ones (B 2, 4, 6) are more rounded at their base, thicker and do not extend so far laterally as the posterior pyramids. Consequently, the line of division (D *b* and *b'*) between the pyramids leans more towards the anterior surface of the kidney, so that the anterior surface of the organ bulges, while the posterior is flat.

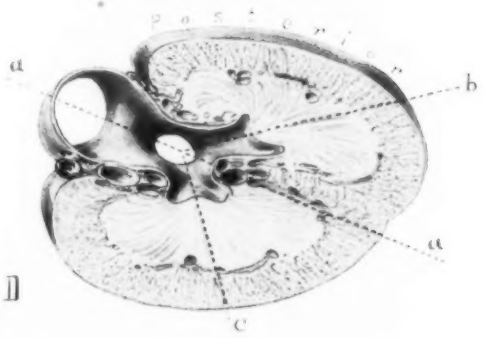
Between the pyramids are the columns of Bertini which carry the larger vessels. Fig. 8 C shows that these columns join in a longitudinal column (*b b'*), in which all of the largest

A



B

C



D

FIG. 1.—Left kidney drawn as though transparent, showing form and divisions of a true pelvis. The major calices are not very marked, the minor calices being situated directly upon the pelvis.

A. Posterior view.

B. Anterior view.

C. Lateral view.

D. Transverse section through B viewed from above.

FIG. 2.—Left kidney with typical form of a divided pelvis. The two divisions of the pelvis are separated by an area of cortical substance (*a*) extending almost to the hilum. As a rule the upper division is narrow and has fewer calices than the lower. The division between the two branches of the pelvis is generally marked on the surface of the kidney by a deep depression.

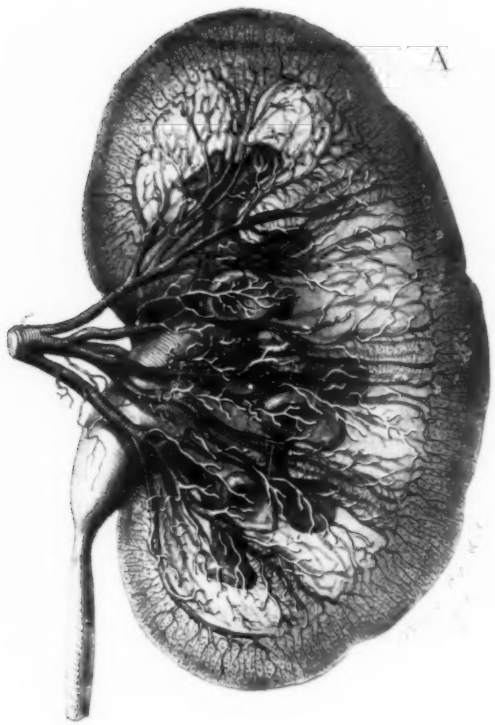
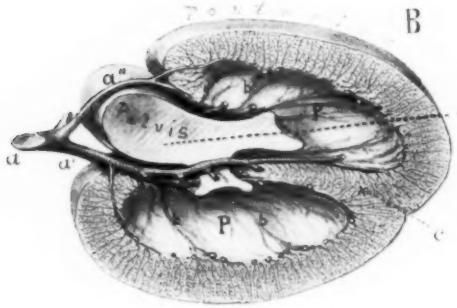


FIG. 3.—The renal artery and the distribution of its branches in relation to the pelvis.

A. Anterior view of a left kidney. There are 6 main branches seen entering the kidney substance. Only one of these (the third) passes posterior to the pelvis at the hilum, also small arteries coming from the upper and lower main branches are seen to pass posterior to the upper and lower calices. All the rest of the arteries pass anterior to the pelvis and its calices. The small branches to the cortex of the anterior portion of the kidney have not been drawn in order that the large branches and the pelvis might appear more distinctly.



B. Transverse section through the middle of the same kidney seen from above. The anterior branch of the artery supplies about $\frac{3}{4}$ of the kidney substance while the posterior branch supplies only $\frac{1}{4}$. The dotted line and arrow indicate the plane of arterial division.

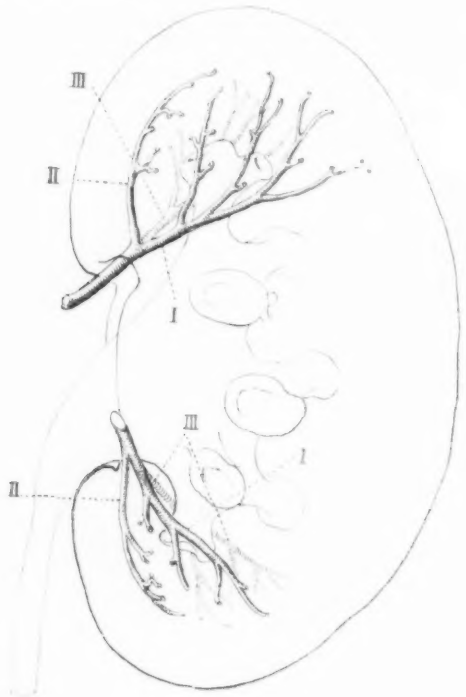


FIG. 4.—Arrangement of the arteries at the upper and lower pole. They come as single trunks from the main artery and run at an angle of 45° or more upward and downward to the vicinity of the major calices, where they divide into three branches.

I. Anterior branch.
II. Median branch.
III. Posterior branch.

The anterior and posterior branches are as a rule much larger than the median.

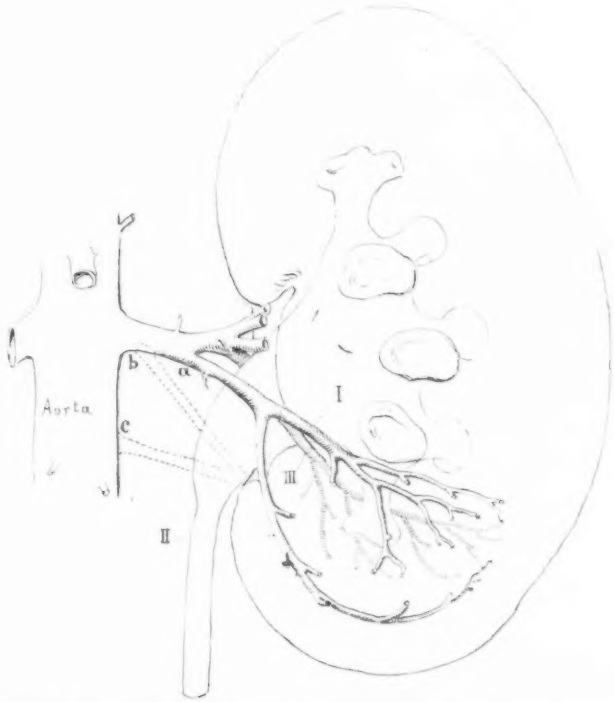
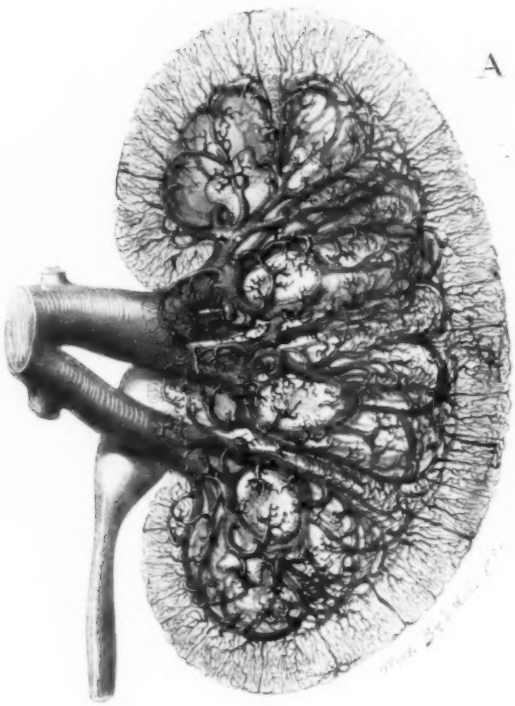


FIG. 5.—Variation of the median branch. This branch may be larger than usual and arise separately from the main artery at points *a* and *b*, or from the aorta direct (*c*). It may be as large as the renal artery itself, in which case it gives off branches I and III or more. Such an arrangement of the arteries is as a rule associated with an abnormal form and position of the renal pelvis.



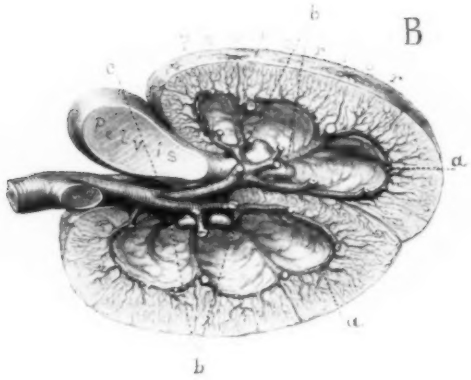
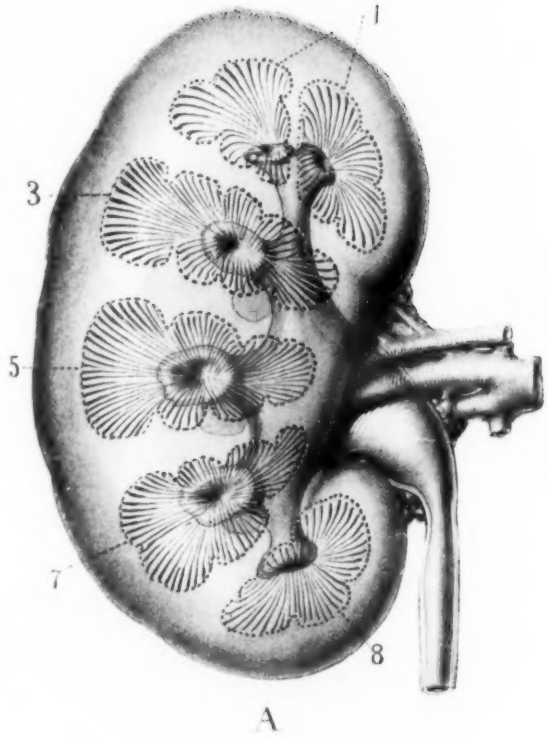


FIG. 6.—The renal vein and the relation of its branches to the pelvis of the kidney.

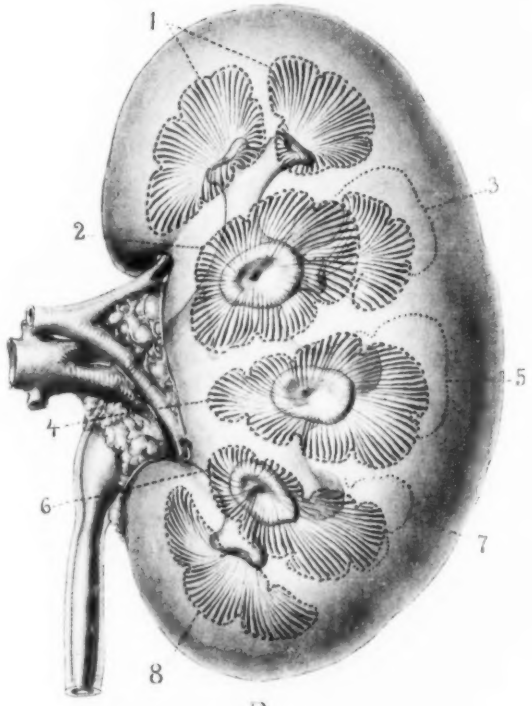
A. Anterior view of the left kidney. For the sake of clearness the small veins of the cortex of the anterior portion of the kidney have been omitted.

B. Transverse section seen from above. There is no collecting vein posterior to the pelvis; all the veins of the posterior region cross over to the anterior portion between the necks of the minor calices (*b*) to join the veins of the anterior region at a point indicated by *c*.

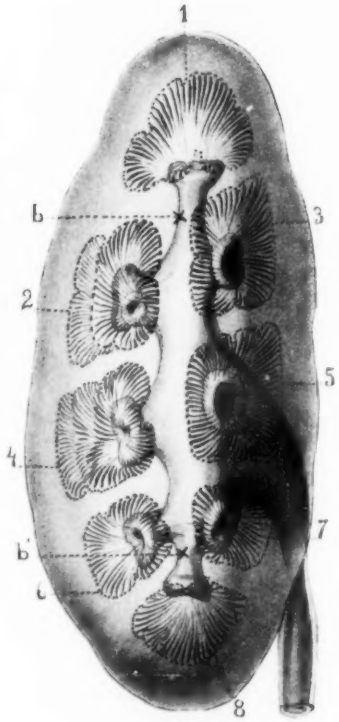
FIG. 1.—A normal left kidney.
A. Posterior view.
B. Anterior view.
C. Lateral view.



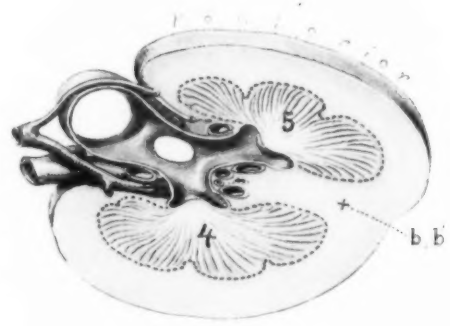
A



B



C



D

FIG. 8.—Same kidney as seen in Fig. 7 with a semi-schematic representation of the pyramids. The converging lines indicate the direction of the uriniferous tubules.

A. Posterior region.

B. Anterior region.

C. Lateral view.

D. Transverse section through B seen from above.

FIG. 9.—A. Lateral view of left kidney, showing the location of the most advantageous incision through the parenchyma in kidneys which have a normal arterial arrangement.

aa' Lateral convex border of kidney.

bb' Position of lateral column of cortical substance containing the vessels.

cc' Best incision.

B. *de* Incorrect direction of incision.

cx Correct direction of incision.

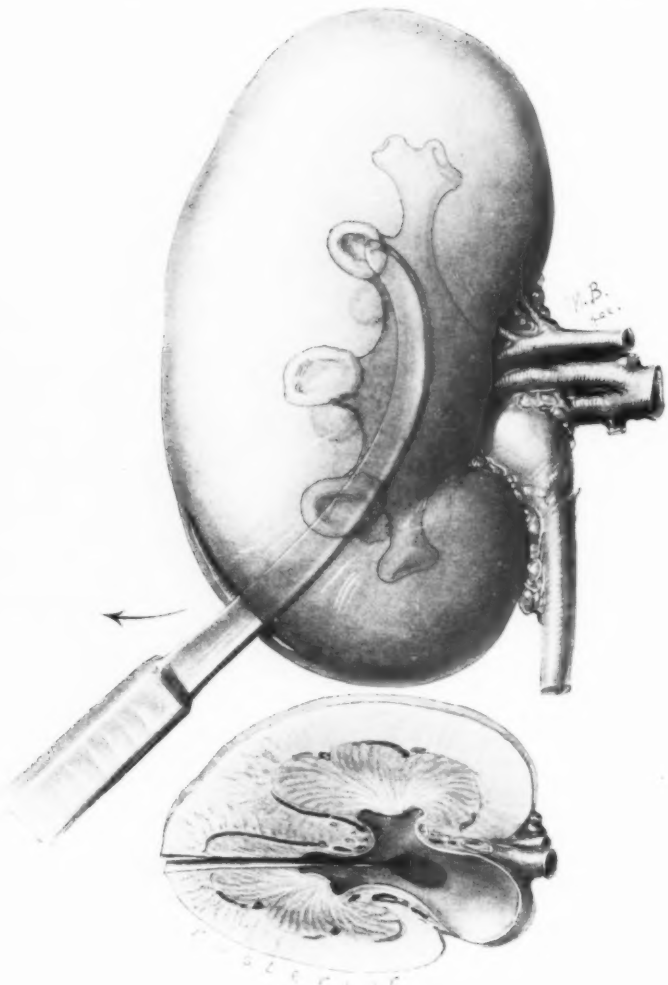


FIG. 10.—Posterior view of left kidney, showing method of exploring and opening the pelvis. The lower diagram indicates the direction of the incision in relation to the papillae of the posterior pyramids.

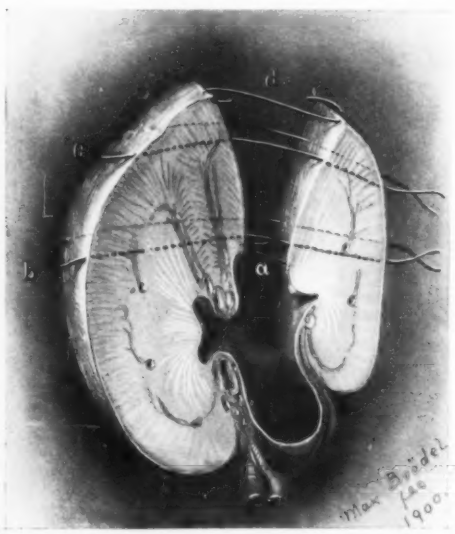


FIG. 11.—Imaginary transverse section through a kidney similar to Fig. 9 B, showing manner of placing the mattress sutures.

vessels of the kidney (three-fourths of the arteries and all of the veins) are found (see also Figs. 3 and 6).

As was said before, in lobulated kidneys this column is indicated as a distinct depression on the surface. The capsule seems thickened along this line and frequently forms a whitish band, to which the perirenal fat appears to be more intimately attached than elsewhere.

Lobulation of varying degrees of distinctness is found in the great majority of cases. The trained eye can detect this lobulation in kidneys which a novice would pronounce perfectly smooth. Should, however, the kidney present not the slightest depression or lobulation, the arrangement of the large stellate veins of the capsule will still serve to sufficiently locate the limits of the pyramids and the position of the important lateral longitudinal column (*b b'*, Figs. 7 and 8). These veins are found to be more conspicuous and are arranged in rows along the lines where the fœtal lobulation has been. (See Fig. 7.)

The Incision and Subsequent Suture.—The above described landmarks should suffice to guide the surgeon in making his incision so that the kidney can be readily opened between its anterior and posterior arterial branches.

Fig. 9 A shows the lateral view of the kidney; *a a'* represents a line showing the lateral convex border; *b b'* indicates the position of the lateral longitudinal column bearing the large vessels; *c c'* is the line along which an incision should be made. Diagram B shows the direction in which the knife should pass. An incision through the middle of the kidney (*d e*), would be inadvisable, inasmuch as it would cut through large vessels in region *f* and would fail to open the posterior calices. The proper direction is indicated by *c x*, the knife remaining in the posterior half of the kidney. The cut should be made anteriorly to the posterior papillæ (*p*) in order to avoid severing the collecting tubules of the posterior pyramids. It is advisable to palpate if possible the vessels and the pelvis at the hilum before making the incision, and if their arrangement is found to be normal, *i. e.* the pelvis at the posterior region of the hilum and the great majority of vessels anterior to the pelvis, then the above described procedure is applicable.

I wish to add a few suggestions as to the incision itself and also as to the subsequent suture.

A short incision is made into the lowermost posterior calyx if possible by means of blunt dissection (Fig. 1 A 7), and through this incision the pelvis is explored. In a collapsed state of the renal pelvis it may be difficult to enter one calyx. In such cases a moderate distention of the pelvis with sterile water or boric solution will facilitate the procedure considerably. If this short incision does not prove satisfactory, the three calices (3, 5, 7) should be carefully opened by means of an incision from within to the surface (Fig. 10). A curved knife will best answer this purpose. A glance at Fig. 3 A shows that short transverse incisions through the anterior or posterior parenchyma may produce little hemorrhage, provided they do not come too near the hilum. However, such incisions never open the pelvis satisfactorily.

The arrangement of the vessels in the kidney suggests the mattress suture as best adapted for approximating the two cut surfaces. Simple interrupted sutures almost always tear the tissues and produce an insufficient union. The mattress sutures are placed at right angles, or nearly so, to the large vessels and thus effectively prevent any tearing of the kidney substance. If the bight of the suture be 1½ to 2 cm., no strangulation of kidney substance should result. The sutures should be applied in the manner represented in Fig. 11.

I. The pelvis is approximated with fine catgut sutures (*a*). These ought to be placed between the calices and take in only the fat, the outer fibrous coat and the muscular layers. The mucous membrane should not be included.

II. The second system of sutures should also be of catgut and should unite the region of the papillæ. They should be mattress sutures (Fig. 11 *b*) and are best placed by means of a long straight three-cornered needle with a blunt point, so that no injury to the large vessels results. A possible oozing would only serve to tighten the grip of these sutures and thus render them more effective.

III. The third system of catgut sutures should also be mattress sutures and be placed parallel to the second through the cortex near the bases of the pyramids (Fig. 11 *c*). Occasionally the third system of sutures is superfluous.

IV. The capsule is then closed in the usual manner (Fig. 11 *d*).

NOTES ON AËRÖBIC SPORE-BEARING BACILLI.

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(*From the Molson Pathological Laboratory.*)

The presence of spore-bearing bacilli in the contents of the intestinal tract—in the normal organs and in various serous exudates—is of fairly frequent occurrence in routine bacteriological investigation, but the identification of such micro-organisms does not always present that ease which is requisite for the convenience of the routine worker.

Aside from the well-known forms of Bacillus subtilis and Bacillus mesentericus, other varieties of spore-bearing bacilli are recognized with difficulty, owing to the inadequate descriptions usually found in text-books devoted to bacteriology, where the pathogenic bacteria naturally receive the greatest attention.

During the past year a number of such forms have been isolated and studied in the Molson Pathological Laboratory and an attempt has been made to group these forms together, using as a basis of classification the table of constant characters recently adopted by Fuller and Johnson.

The various reactions of these bacilli on the usual culture media have been estimated in so far as possible with reference to the possession, or lack of possession, of any of these constant characters, and the results of this study are embodied in the chart which accompanies this paper. Some varieties here described may be identical with bacilli already referred to in the literature, but an attempt to recognize them positively has not met with success, and on this account they have been looked upon as either new species or new varieties of old species.

While such a description as this may at first seem inadequate, experience has shown that morphology alone fails to reveal the identity of our ordinary micro-organisms and that such a chart, as the one here utilized for bacteriological protocols, is of the greatest assistance in species differentiation.

These spore-bearing bacilli were isolated at various times in the laboratory under the ordinary conditions of aërobic cultivation and are purely aërobic or facultative anaërobes in character. They may be divided into two groups—pathogenic and non-pathogenic—in each group being included here five different varieties. The criterion of pathogenicity is in all cases determined by the intraperitoneal inoculation of a mouse with a 1 cc. dose of a 24-hour old culture of the bacillus in question.

The members of both groups grow with ease on the routine culture media, the production of spores taking place rapidly under the usual conditions, a greater abundance of spores naturally being observed on the older cultivations. These bacilli possess certain characters in common: The carbohydrates are never fermented with the production of gas; milk is coagulated, probably by the action of enzymes, as the reaction remains neutral or alkaline until after the digestion of the casein when a small amount of acid is produced. The liquefying powers of these bacilli are especially well marked, often casein, gelatin and blood serum alike being affected.

While the correlation of different biological properties in bacteriology has as yet met with rather indifferent success, yet it is a significant fact that marked liquefying powers are often associated with the capacity of spore-formation. Similar deductions cannot be drawn with regard to motility, which occurs, one might say, almost at random and cannot be associated with other characters, as for example, pathogenicity.

The growth on potato is usually very abundant, this growth serving at times as a diagnostic feature. The present status of our knowledge of the conditions under which indol and a fæcal odor are produced, does not permit any reliable data to be drawn from these reactions, but their importance, when given, renders their careful study necessary.

Under *Group 1*, pathogenic spore-bearing bacilli, have been included five different varieties:

Bacillus A is a capsulated bacillus which bears some resemblance to Bacillus mucosæ capsulatus, but differs in so many reactions, especially in its capacity to form spores, that it has been placed in this group. It was isolated from the liver of a healthy rabbit. Its morphology is that of long rods with square-cut ends in fresh cultures, the bacillus appearing singly or in short chains. In old cultures it loses its characteristic form, appearing as chains of short oval bacilli with the phenomenon of polar staining especially well marked, two small refractile granules being seen at either end of each individual. The capsule is apparent with all dyes, but it is most readily observed when the bacillus is found in the tissues of an inoculated animal when the organism itself appears in its original character as a long straight bacillus staining deeply and regularly throughout.

Bacillus A is non-motile, forms a characteristic scum on fluid media, liquefies gelatine, coagulates milk without acidifying or digesting the casein. It is pathogenic to mice, guinea-pigs and rabbits, all of which died in from 24 hours to 10 days, revealing at autopsy no special appearances beyond those seen in infections in general and furnishing pure cultures of the bacillus from the internal organs.

Old cultures of this bacillus—from which, by the way, a peculiar sickening odor is obtained—will kill even as large animals as rabbits in two hours, the animals dying with all the symptoms of profound toxæmia.

Bacillus B was obtained from the kidney of a healthy rabbit and in its morphology is not unlike the preceding variety. It is a long bacillus with square-cut ends—without a capsule—in old cultures growing out into degenerate forms, showing the greatest diversity in morphology. Spore-formation occurs with great rapidity.

Bacillus B is non-motile and does not form a scum on broth, liquefies gelatin, coagulates milk, digesting the casein and producing an acid reaction. It is pathogenic to mice and guinea-pigs, which survive from 24 to 72 hours, but is not pathogenic to rabbits.

Bacillus C was obtained from the same kidney which furnished the cultures of Bacillus B. It is a long, narrow bacillus with rounded ends, quite regular in shape and maintaining its regularity even in old cultures. Its growth is somewhat slower than most of the spore-bearing forms.

It is actively motile in 24-hour old cultures, forms a pellicle on broth, liquefies gelatin and blood serum, coagulates milk and digests the casein with the production of an acid reaction. It is pathogenic to mice, guinea-pigs and rabbits, the animals succumbing in from one to three days, and showing the presence of the bacillus in large numbers in all of the internal organs.

Bacillus D was obtained from a rabbit's kidney. It is a long, thick bacillus growing at times in short chains; it exhibits polar staining to a marked extent, peculiar unstained areas often being visible in the bodies of the bacilli.

It is actively motile, liquefies gelatin, casein and blood serum, but does not produce acid or coagulate milk. It is pathogenic to mice and guinea-pigs, these animals dying after a lapse of from 12 to 15 days, the characteristic organism being then obtained from the different organs.

Bacillus E is a large bacillus obtained by Dr. Yates from a pleural exudate, which in its morphology cannot be positively distinguished from the preceding forms. Its varied reactions on culture media testify to its originality. It grows as a pellicle of broth, liquefies gelatin but not blood serum, and coagulates milk, digesting the casein. Mice are killed by intraperitoneal inoculation in from 3 to 4 days.

Prototypes of spore-bearing bacilli which are non-pathogenic are Bacillus mesentericus and Bacillus subtilis—bacilli which are probably the most common forms of laboratory contamination. For completeness in the chart the reactions of these bacilli have been either estimated or adopted from Fuller and Johnson. With these, however, may be grouped three other bacilli:

Bacillus F was obtained from the liver of a guinea-pig. It is a thick, plump bacillus, at times in short chains, regular and deeply staining. In its morphology it is somewhat similar to mesentericus but is rather smaller than the potato bacillus, from which it differs, moreover, in not forming a wrinkled growth on agar nor a pellicle on broth, and in not growing in the closed arm of the fermentation-tube nor producing a fæcal odor.

Bacillus G, isolated from the stomach contents of an autopsy subject, is evidently a variety of Bacillus mesentericus which it closely resembles in morphology but is distinguished by liquefying only gelatin and casein, not blood serum, and by its failure to give a characteristic growth on potato.

The last member of this group, *Bacillus H*, was obtained by Dr. Nicholls from the liver of a healthy cat. It is the only one of this group which is non-motile and is distinguished from the other members by not forming a scum on broth, in not causing a wrinkled growth on agar and in not growing in the closed arm of the fermentation-tube. It liquefies gelatin and blood serum, coagulates milk, digesting the casein and producing an acid reaction.

It is hoped that this plan of description of bacteria may prove of value to observers in different laboratories, and should its adoption be brought about in different universities, a considerable advance can be made in settling the complex problems of species differentiation.

NOTE:—Several of the bacteria here described are said to be facultative anaërobes in character but without the capacity of growing in the closed arm of the fermentation-tube. The latter reaction has been utilized as a criterion of anaërobic growth by a number of observers, it being maintained that the growth of the organism will exhaust the oxygen from the open bulb leaving an oxygen free medium in the closed arm, in which the facultative anaërobes will always grow. This apparent contradiction in reaction is difficult of explanation unless one considers that certain bacilli, aërobic and facultative anaërobes in character, grow with greater avidity in a medium which has free access to oxygen, thus being attracted to the open bulb of the fermentation-tube, where they grow luxuriantly, yet nevertheless being capable of development in an atmosphere devoid of this substance, as is proved by cultivation in conditions suitable for anaërobic growth. Compare in this connection the chart of Fuller and Johnson where the Bacillus annulatus of Wright is described as a facultative anaërobe and yet failing to grow in the closed arm of the fermentation tube.

TYPE.	NAME.	SOURCE.	MORPHOLOGY.				BIOLOGY.																										PATHOGENICITY.
							CULTURAL FEATURES.									BIOCHEMICAL FEATURES.																		MICE.
							Broth.		Agar.		Gelatin Plate.		Potato.		Fermentation Tube.				Liquefaction.			Gas production.						Milk.			Agar.			
			Bacillus.	Diameter greater than one mikron.	Motile.	Spores.	Scum.	Turbidity.	Dull.	Wrinkled.	Characteristic appearance.	Visible.	Luxuriant.	Growth in closed arm.	Grows at body temp.	Facultative anaërobe.	Affected by range of reaction.	Gelatin.	Casein.	Blood serum.	Dextrose.	Saccharose.	Lactose.	Nitrites produced.	Indol.	Fæcal odor.	Acidity before coagulation.	Coagulation.	Acidity after coagulation.	Chromogenesis.	Fluorescence.	Most favorable reaction.	Intraperitoneal inoculation.
Spore-bearing Pathogenic Bacilli.	Bacillus A.	Liver of rabbit	+	+	−	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−	−	−	−	−	−	+	−	−	+	+
	Bacillus B.	Kidney of rabbit	+	−	−	+	−	+	+	−	+	+	−	+	+	+	+	+	+	−	−	−	−	−	+	+	+	−	−	0	+
	Bacillus C.	Kidney of rabbit	+	+	+	+	+	+	−	−	+	+	+	+	+	+	+	+	+	+	−	−	−	−	+	+	+	−	−	0	+
	Bacillus D.	Kidney of rabbit	+	−	+	+	+	+	−	−	+	+	+	−	+	+	+	+	+	+	−	−	−	−	+	+	−	−	−	0	+
	Bacillus E.	Pleural exudate	+	+	−	+	+	+	−	−	+	+	+	+	+	+	+	+	+	+	−	−	−	−	+	−	−	−	−	+	+
Spore-bearing Non-pathogenic Bacilli.	B. Subtilis.	?	+	+	+	+	+	−	+	+	+	+	+	+	+	+	+	+	+	+	−	−	−	−	+	+	?	−	−	?	−
	B. Mesentericus.	?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−	−	−	+	−	−	−	−	+	−
	Bacillus F.	Liver of guinea-pig	+	−	+	+	+	+	−	−	+	+	+	−	+	+	+	+	+	+	−	−	−	−	+	+	−	−	−	0	−
	Bacillus G.	Stomach of man	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−	−	−	−	+	+	−	−	−	0	−
	Bacillus H.	Liver of cat	+	+	−	+	−	+	+	−	+	+	+	−	+	+	+	+	+	+	−	−	−	−	−	+	+	−	−	+	−

NOTE.—The media here employed were prepared according to the directions given in the 1897 report of the Committee of American Bacteriologists with the exception that the reactions have been rendered neutral to phenol-phthalein. The plus and minus signs have also been used in the manner directed by this Committee.

SUMMARIES OR TITLES OF PAPERS BY MEMBERS OF THE HOSPITAL AND MEDICAL SCHOOL STAFF APPEARING ELSEWHERE THAN IN THE BULLETIN.

SIMON FLEXNER, M. D. Nature and Distribution of the New Tissue in Cirrhosis of the Liver.—*University Medical Magazine*, November, 1900.

ANDREW H. WHITRIDGE, M. D. Report of a Case of Tetanus with Recovery.—*Philadelphia Medical Journal*, October 20, 1900.

WILLIAM W. FORD, M. D. Venous Thrombosis in Heart Disease.—*Philadelphia Medical Journal*, November 17, 1900.

WILLIAM SYDNEY THAYER, M. D. Observations on the Blood in Typhoid Fever.—*Journal of the Boston Society of Medical Sciences*, Vol. 5, No. 1, 1900.

ROBERT L. RANDOLPH, M. D. Ossification of the Choroid Leads to the Identification of the Body in an Insurance Case.—*Journal of the American Medical Association*, November 10, 1900.

HUNTER ROBB, M. D. Remarks upon the Post-Operative Treatment; with Especial Reference to the Drugs Employed in 114 Consecutive, Unselected Abdominal Sections without a Death.—*Cleveland Medical Gazette*, October, 1900.

ADELAIDE DUTCHER. Where the Danger Lies in Tuberculosis.—*Philadelphia Medical Journal*, December 1, 1900.

WILLIAM OSLER, M. D. On the Study of Tuberculosis.—*Philadelphia Medical Journal*, December 1, 1900.

J. HALL PLEASANTS, M. D. A Case of Acromegaly in a Negro Associated with a Low Grade of Giantism.—*Maryland Medical Journal*, December, 1900.

ANDREW H. WHITRIDGE, M. D. The Importance of Instruction in Medical Schools upon the Modification of Milk for Prescription Feeding.—*Maryland Medical Journal*, December, 1900.

THOMAS R. BROWN, M. D. A Review of Some of the Recent Work on the Physiology and Pathology of the Blood.—*Maryland Medical Journal*, December, 1900.

J. H. MASON KNOX, PH. D., M. D. Compression of the Ureters by Myomata Uteri.—*The American Journal of Obstetrics*, September and October, 1900.

Twenty-five cases are collected from the literature and the gynecological records of the Johns Hopkins Hospital in which myomata uteri were found to have exerted more or less pressure upon one or both ureters. The small number of such cases reported is probably due to the fact that moderate grades of ureteral compression from this cause produce few definite symptoms and the condition is consequently overlooked.

The cases are gathered in several groups according to the severity of the ureteral and renal involvement; thus:

Group A.—Moderate ureteral involvement, 8 cases.

Group B.—Pronounced ureteral pressure, 5 cases.

Group C.—Mechanical destruction of renal substance, 1 case.

Group D.—Ureteral pressure with inflammation, associated with

a. Chronic nephritis, 2 cases.
b. Congenital cystic kidneys, 1 case.
c. Pyogenic infection, 2 cases.
d. Pyogenic infection, severe, 3 cases.
e. Kidney, a pus sac, 3 cases.

The several important features suggested by analysis of the cases are then discussed. It is found that this ureteral complication during the growth of a myomatous uterus occurs usually at middle life, that the tumor mass is usually large in size and firm in consistency, and that although the pressure upon the ureter can be exerted at any point or along much of its course, the most frequent seat for compression is at the pelvic brim. Of the complications the formation of adhesions which often render operative interference difficult and the secondary infection of the urinary tract are most important. The pathology of the condition is briefly referred to, beginning with simple dilatation of the ureters and renal pelvis and progressing, unless relieved, to extreme grades of hydroureter and hydronephrosis, or if the element of infection is added to, pyoureter and pyelonephrosis. There are but few definite signs or symptoms of the condition other than a partial retention of the urine in advanced cases. Hence the diagnosis must be made by a careful direct examination bimanually and with the cystoscope through which the ureters can be catheterized when their involvement is suspected.

Three lines of treatment are suggested: (*a*) expectant, applicable when the ureteral symptoms are slight and give no discomfort to the patient; (*b*) palliative, permissible only when the ureteral compression is moderate and is not becoming worse or when the condition of the patient is so alarming as not to tolerate a more radical method; (*c*) radical, that is, the removal of the compressing mass. This should be undertaken unless contraindicated whenever there is definite indication that the ureters are markedly compressed. The following conclusions are drawn:

1. That some compression of the ureter is produced by a large proportion of all large myomatous uteri.

2. The resulting hydroureter and hydronephrosis may continue for years and give rise to no discomfort to the patient.

3. The presence of a dilatation of the ureter and renal pelvis however slight, lowers the resistance of these organs to toxic and infectious agents, and hence inflammatory conditions of the ureters and kidneys not infrequently follow ureteral compression.

4. This being the case in all instances of uterine myomata, the possibility of ureteral involvement must be considered. When such a condition is suspected every effort should be made by means of direct examination, by ureteral catheter, etc., to arrive at an accurate diagnosis.

5. Exploratory incision is occasionally justified to establish a diagnosis.

6. The ureters should be inspected whenever the abdomen is opened for the removal of the tumor.

7. A myomatous mass found to be exerting undue pressure upon one or both ureters should be removed, if possible, unless operative interference is contraindicated.

8. Such serious sequelæ of ureteral compression as extreme hydronephrosis, pyelonephrosis, etc., should receive appropriate treatment.

The references to the cases and a table are appended.

PROCEEDINGS OF SOCIETIES.

THE JOHNS HOPKINS HOSPITAL MEDICAL SOCIETY.

October 15, 1900.

The meeting was called to order by the retiring president, Dr. Henry M. Thomas.

Dr. Thayer presented resolutions expressing the feelings of the Society at the death of Dr. Lazear, which were unanimously adopted.

The annual election of officers was held and Dr. William H. Welch was elected president, and Dr. G. Brown Miller secretary, for the coming year.

Case of Asthma with Cyanosis, Extensive Purpura, Painful Muscles, and Eosinophilia. DR. OSLER.

This is an unusual case in several respects. This young man came in on the 3d of October complaining of pain in the abdomen. His personal and family history are negative so far as this present condition is concerned. He had eaten abundantly of pork, and it is not known whether it was raw or cooked, as he is a Pole and it is difficult to understand him.

His present illness began with a chill, accompanied by pain in the abdomen and on the three following days he had nausea and vomiting. There was no diarrhœa. There had been cough and expectoration since the onset of the illness and he had been confined to bed. On the night of admission the most remarkable feature noticed was a very deep cyanosis. The respiration was somewhat labored, being about 30 to the minute, but there was no urgent dyspnœa. There were numerous dry râles and much wheezing in the tubes. He remained in this condition of remarkable cyanosis with practically no fever, except a slight one on the third day; indeed, as a rule, his temperature has been subnormal. The cyanosis was extreme and with it, which is noteworthy, he remained constantly recumbent.

On October 7, in addition to the cyanosis, petechiæ appeared over the body, first on the face and chest and then over the skin of the entire body except the legs. He presented a unique appearance, so far as our experience here is concerned, and looked very much like a case of malignant hemorrhagic smallpox. A differential count showed 11 per cent of eosinophiles. On the 8th of October he showed great tenderness of the muscles. The slightest touch on the muscles of the arms or legs caused him to wince. A portion of muscle was excised and showed marked degeneration with a great deal of fat in the fibres, but no trichinæ. On the 9th his leucocytosis rose to 52,000, the petechiæ had increased, his face was swollen, and he looked to be in a very critical condition. He was, however, rational, apparently comfortable and took his food fairly well. On the 11th the eosinophiles had risen to 25 per cent. Yesterday the cyanosis began to disappear. Cultures from the blood are negative and there is no Widal reaction. There is a trace of albumin and few granular casts.

Of the groups of cases of cyanosis there is one in which the air cannot get to the blood – the respiratory group; a second group in which the blood cannot get to the air —the cardiac; and there is a third group in which there are changes in the hemoglobin, such as cases of poisoning by carbon monoxide or the coal-tar products. There are three conditions in which, in hospital practice, we see extreme cyanosis with comparative comfort: First, the cases of chronic emphysema and asthma. A patient will come in completely cyanosed, quite livid, and yet fairly comfortable and not especially short of breath. Secondly, the cases of congenital heart disease. Thirdly, the cases of antifebrin and antitoxin intoxication.

In this case there has been no methemoglobin in the blood, and I think it cannot be regarded as belonging to the toxic form. He has had some asthma and emphysema; with that would agree the condition of eosinophilia. The question is whether or not he has had a myositis and possibly trichinosis. That cannot be determined until we have further examined the muscle. (It is negative, too).

DISCUSSION.

DR. WELCH.—Are there any abnormal leucocytes, such as are not normally found in the blood?

DR. FUTCHER.—No. There are many cells, however, which it is difficult to classify, because it is hard to say whether they are eosinophiles or polynuclears; they seem to stay in an intermediate stage.

DR. WELCH.—Dr. Osler spoke of the similar appearance to black smallpox when the petechiæ were so abundant. It has been claimed that the leucocytic count is quite characteristic in smallpox; in fact, so definite in its proportions as to be a decided help in diagnosis.

Bisection of the Uterus in Hysterectomy. DR. KELLY.

[See BULLETIN for January, 1901.]

Exhibition of Surgical Cases. DR. MITCHELL.

Four cases of typhoid perforation were described, and one of appendicitis. (To appear in full in a later number.)

DISCUSSION.

DR. OSLER.—This last case is exceedingly interesting, for it is, if I remember rightly, the only case of abscess of the liver in connection with typhoid that we have had in the hospital. I have seen two such cases but it is one of the rarest of all complications of the disease. The positive Widal, the hemorrhages, the absence of ameba and the history make it quite clear as to the character of the original disease.

DR. THAYER.—I wish to ask, referring to the case in which the appendix was removed, how long before death the last rise of leucocytes was observed; whether it was, as the Germans say, due to the death agony or to something else.

Dr. Mitchell.—It was several hours before death.

Dr. Keen in his remarks upon surgical complications speaks of 21 cases of liver abscess with two recoveries.

Dr. Welch.—I remember seeing one case of a somewhat different type, which occurred before the days of making cultures, in which there were thrombosis of the intestinal mesenteric veins and multiple metastatic abscesses throughout the liver instead of one large abscess.

Dr. Osler.—I think there is one point that ought to be quite clear in reference to the condition of the peritoneal surfaces of typhoid ulcers. Such a condition as that described by Dr. Mitchell does not indicate that perforation has of necessity occurred in those ulcers. Every deep ulcer is sure to have a great deal of injection about it, or even lymph on it, and sometimes in very intense and severe cases that come to autopsy at the end of the second week you can count through the serosa every Peyer's patch that is involved. I do not think, therefore, that it would be right to say, even with the most intense swelling and redness, that it necessarily follows such an ulcer will perforate.

Report of Cases from the Garrett Hospital for Children. Dr. W. B. Platt.

a) Bow-Leg, b) Knock-Knee, c) Epispadias. Patients shown in each case with photograph of condition previous to operation.

The cases of bow-leg and knock-knee are presented together to illustrate the opposite conditions. We know that infants at birth, and also long before they have borne pressure upon the limbs at a later date, present bow-legs. These, as well as the bow-legs acquired after walking, often become straight spontaneously. What chiefly interests us is, what to do if this spontaneous straightening does not occur. If spontaneous correction does not take place before the age of four years, or if orthopedic appliances properly applied do not accomplish the purpose before that age, there is little reason to hope for further improvement without operation, on account of the hardening of the bones that quickly ensues in such cases.

In bow-leg we have to deal with a general curvature of the femur, tibia, and fibula, which is accentuated at certain points. This curvature is always more or less outward, and often forward as well.

The extreme curvature is doubtless due chiefly to the weight of the body upon softened bones, and in but slight degree to muscular tension.

Rickets is clearly the cause of the softening in the greatest portion of cases. If knock-knee (like bow-legs) be due to rickets we would expect an inward curve instead of the angle which we find. Here we have a disproportionate growth of the inner portion of the lower end of the femur, sometimes also of the upper end of the corresponding part of the tibia. A practical point is, that in extreme bow-leg we find flat foot, whereas in extreme knock-knee we frequently get an acquired club foot.

The gait in the two classes of cases is exactly the reverse, the one of the other. The two patients here shown are each five years of age. The "bow-leg" is somewhat deficient mentally. The deformity in the latter case was remedied by dividing the tibia nearly through, near the middle, with a chisel, proceeding from the anterior and inner aspect, outward. The bone was then fractured at this point, and the leg straightened. The fibula fractures with the tibia. The entire limb was now put up in plaster for three weeks. The usual result is an entire success. After both knock-knee and bow-leg osteotomies, there is a good deal of oozing, and the plaster bandage is not infrequently stained through. If the operation has been performed aseptically, there is never any trouble.

Osteotomy for knock-knee is performed on a different plan and in a different place. Mackewen's place of election is three-quarters of an inch above the adductor tubercle on the inner aspect of the femur. The chisel is driven about two-thirds of the way through the femur, going upward and downward after entering the chisel, so as to divide the anterior and posterior aspects of the bone. After withdrawing the chisel the limb is forcibly straightened. This impacts the lower fragment into the upper, and chiefly on the innermost line of the division. The undivided part of the bone bends like a hinge without fracture. The limb is immediately put up in plaster in a slightly over-corrected position.

In both the above cases, I operated upon the right limbs, while Dr. Cone operated upon the left knock-knee, and Dr. Ratcliffe upon the left bow-leg.

c) Epispadias. The patient, W. L., is twelve years of age. He has been operated upon six times during the past seven years. Five operations are theoretically called for, but one or more of them usually have to be repeated. The series of operations devised by Prof. Thiersch are the best in my opinion. First of all a penis must be made, as it is now a rudimentary affair, consisting of little more than a button, drawn up close to the pubes, the imperfect glans penis almost in contact with the hole which is directly over the deep urethra, and in contact with the pubes.

The first operation is to divide both corpora cavernosa subcutaneously, with a tenotome, close to the pubes. The penis is then drawn out and bound down with bandages for several weeks until it keeps more nearly to the normal position. After waiting for three or more months the second operation is done by sinking the urethra into the body of the glans and covering it in. Again a wait, when the third operation is performed by covering in the urethra on the shaft of the penis by superimposed skin flaps. The fourth procedure is to buttonhole the apron of skin below the glans, thrust the latter through it and fasten the edge of this new foreskin to the posterior margin of the glans and to the anterior edge of the new urethra in the shaft. After another wait, the last operation is done by closing the opening into the urethra close to the pubes by superimposed flaps, one of denuded skin, and one of skin only, from the pubic region.

In all these operations the difficult thing is to get the flaps to unite urine-tight, and without loss of substance. The last one is the most difficult to bring to a successful result. The final results in these cases, at best, are like the noses made by rhinoplastic operations, not beautiful; but we are thankful if they are useful, and the patient is able to hold his urine night and day instead of constantly dribbling, or losing urine on the slightest provocation, thus saturating his clothing, and making him unendurable to himself and to others. The increasing control of the sphincter with the successive operations until complete control is reached, is interesting.

A very clean operation, dry dressings, and a very faithful nurse are absolutely necessary to success.

The Relation of Cholelithiasis to Disease of the Pancreas and to Fat-Necrosis. DR. OPIE.

The patient whose history I shall relate was admitted to the service of Dr. Osler complaining of pain in the abdomen and fever. His family history is unimportant. He had suffered frequent attacks of indigestion characterized by pain after eating and, rarely, by nausea and vomiting. Six months before his fatal illness he had had an attack of jaundice which lasted three weeks and was accompanied by severe abdominal pain and some fever. The jaundice disappeared and he remained in good health until the beginning of this illness. He was suddenly attacked about nine o'clock one night with very severe abdominal pain followed by nausea and vomiting. The vomiting continued throughout the night but subsequently was not severe. The pain was great for about four days but became less severe. On the seventh day of his illness, tenderness and swelling appeared in the right hypogastric region. Jaundice was not noticed previous to his admission to the hospital. His temperature ranged between 100° and 103°.

He was admitted to the hospital on the eighteenth day of his illness and the note made by Dr. Futcher shows that he was a large well-built man with a sallow complexion; the conjunctivæ had a very slightly yellowish tint. Examination of the chest was negative. On inspection of the abdomen a distinct prominence was noticed in the right hypogastric region extending into the right half of the umbilical with its lower margin at the level of the umbilicus. The urine at this time contained no sugar and its specific gravity was 1.017. His condition remained unchanged for two days, but on the night of the third day he became restless and delirious and his temperature rose gradually to 104°; the white blood-corpuscles numbered 19,500. The patient was transferred to the surgical side where the diagnosis of acute pancreatitis was made by Dr. Bloodgood and an operation was performed. An abscess was entered through an incision in the great omentum between the stomach and transverse colon. The cavity contained dark fluid, in which were necrotic particles. A drainage tube, packed about with gauze was inserted into the wound. There was a considerable amount of discharge from the wound. The patient did not rally from the operation and died at the end of four hours.

An autopsy was performed a few hours after death. The skin surface was not jaundiced though the conjunctivæ had a yellowish tint. On opening the abdomen, the omentum, lightly adherent in the neighborhood of the wound, was found to contain a great quantity of fat. Studding this fat were conspicuous opaque white areas, about 3 mm. in diameter and extending below the surface not more than 1.5 mm. Similar areas were present in the fat of the mesentery, in that of the abdominal wall below the peritoneum over the bladder and in the fat in front of the kidneys. The preserved specimen here exhibited shows these areas of necrosis very well. The abscess which was entered at the time of operation was found to occupy the site of the lesser omental cavity and contained about 500 cc. of dark fluid in which were necrotic solid particles. Its wall was black and necrotic in appearance but on cutting into it the dark discoloration was found to extend only a short distance and gave place to opaque white areas of fat-necrosis. Projecting from the posterior wall of this cavity was a large projecting mass lying to the right of the descending portion of the duodenum, extending toward the spleen. It was composed of dark reddish-black material, was spongy in texture and suggested changed blood. The pancreas lay beneath it and was in large part well preserved. The gall-bladder contained a large number of faceted calculi (about 100) of an average diameter of 1 cm. In the common duct, 1.5 cm. from its origin, was a similar calculus. At this point the pancreatic duct was separated from the common bile-duct merely by a thin membranous septum, and it was upon this septum that the gall-stones lay.

Microscopic examination shows that the interstitial tissue of the pancreas is thickened and contains many cells in which are brownish-yellow pigment granules giving the reaction of iron. The necrotic material lying upon the surface of the pancreas is found to be changed blood. Cultures made from this necrotic material in the wall of the abscess were studied by Mr. F. H. Bassett; they contained the Bacillus coli communis, proteus vulgaris and lactis aërogenes.

The changes in the pancreas show that hemorrhage had occurred into and about the pancreas sometime before death. In the common bile-duct was lodged a gall-stone in such a position that it might readily compress the pancreatic duct and give rise to changes in the pancreas.

The relations of the pancreatic and common bile-ducts are well known. They lie in contact for a distance of about 2 cm. and one can readily imagine that a gall-stone lodged near the orifice of the common duct might compress the pancreatic duct. In about two-thirds of all bodies the two ducts of the pancreas anastomose within the gland, while in the other third there is no anastomosis, and should a gall-stone, lodged in the common bile-duct, compress the duct of Wirsung, the pancreatic accretion would be forced back upon the gland. When the common bile-duct is obstructed, the obstruction to the gall is readily shown by the yellow

color of the bile pigments which escape into the tissues, but when the pancreatic duct is obstructed the results are not so evident. Nevertheless, the condition of fat-necrosis gives evidence of the escape of the pancreatic secretion. The essential feature of this necrosis of fat is the splitting of the fat into its fatty acids and glycerin and numerous experiments have shown that if one produces a lesion of the pancreas which causes the pancreatic juice to escape into the tissues, necrosis of fat results.

In a series of experiments[1] performed upon cats, I ligated both ducts of the pancreas and at the end of about three weeks a very wide-spread necrosis of almost the entire abdominal fat, and to a less extent of the pericardial and subcutaneous fat as well, resulted. If, however, the ducts be ligated and pilocarpin be administered in order to stimulate the secretion of the gland, similar wide-spread necrosis occurs within four days, showing that the escape of the pancreatic juice is the essential feature. Where we find necrosis of the abdominal fat, we may assume that some lesion of the pancreas has allowed the escape of the fat-splitting ferment of the pancreatic secretion into the surrounding fatty tissue.

I have examined the literature of acute pancreatitis and fat-necrosis to determine the possible relationship of cholelithiasis to acute lesions of the pancreas, and I have found thirty-two cases in which such lesions were associated with the presence of gall-stones demonstrated by autopsy. Gall-stones, as is well known, are very frequently found at autopsy and may have caused no symptoms during life. It is therefore necessary to show that their presence bore some relation to the acute pancreatic lesion. In eight of the collected cases a gall-stone was actually lodged in the common duct near its orifice or had escaped from this position and lay in the duodenum. In five of these cases there were hemorrhagic lesions of the pancreas; the gland was enlarged and the interstitial tissue was infiltrated with blood. In the absence of microscopic examination it is impossible to say whether the lesion was a simple hemorrhage or a hemorrhagic inflammation. Four of the cases are particularly interesting, since death resulted within forty-eight hours from the onset of symptoms; the sudden onset of pain in the abdomen with nausea and vomiting was followed by collapse and death within forty-eight hours.

In three cases the symptoms noted above were followed by death within forty-eight hours. At autopsy the pancreas was infiltrated with blood; the gall-bladder contained calculi, but the one which had caused the fatal attack had escaped into the intestine and was not found. In one additional case a gall-stone had found its way into the duct of the pancreas.

There is another group of six cases in which the relationship of the pancreatic lesion to cholelithiasis may also be established. The duration of the fatal illness is longer and the symptoms are definitely those of gall-stone lodged in the common duct; *e. g.*, pain and jaundice. At autopsy the diagnosis of gall-stone colic is confirmed by the presence of numerous calculi in the gall-bladder, but none are found in the ducts. It is not surprising that with the longer duration of the case the stone causing the trouble should have escaped into the intestine. In the former group it has been seen that a stone lodging only forty-eight hours might produce an intense hemorrhagic lesion. In these cases of longer duration there is usually evidence of previous hemorrhage; the organ is the seat of gangrenous inflammation and lies in an abscess limited to the lesser peritoneal cavity.

In fourteen cases the relationship could not be so definitely established. Though symptoms of gall-stone colic were present, the stone was not found lodged in the duct, nor was jaundice present. The changes in the pancreas resembled those in the previous cases, and it seems probable that in most of these cases the pancreatic lesion was a result of the lodgment of a gall-stone in the common duct near its orifice.

In twenty-six of the thirty-two cases fat-necrosis was present.

Discussion.

Dr. Thayer.—Two of the cases to which Dr. Opie has referred I reported ten years ago. The men had had repeated attacks of gall-stone cholic and finally one very sharp attack with intense abdominal pain, sudden unaccountable collapse and death within forty-eight hours after the first symptoms. Autopsies showed acute hemorrhagic pancreatitis with, I think, evidences of older hemorrhages than those associated with the fatal attack, suggesting the possibility that with earlier attacks there had been some pancreatic trouble.

Dr. Welch.—By this communication Dr. Opie has added another valuble contribution to his important series of papers dealing with the histology and pathology of the pancreas. His previous experimental work has enabled him to come to a clear and satisfactory interpretation of his own and others' observations of the influence of gall-stones in the causation of various forms of pancreatic disease. Without this basis of experimental work this relationship of gall-stones to diseases of the pancreas could not have received so complete an explanation.

In this connection I wish to call attention to the importance of occlusion of excretory channels and ducts in favoring infection. This can be observed not only with the pancreatic and biliary ducts, but also with the urethra, ureter, salivary and other ducts opening upon exposed surfaces normally carrying bacteria. As Dr. Opie's experiments have shown, the damming back of the pancreatic secretion and its escape into surrounding and distant parts cause multiple fat-necroses and anatomical changes in the pancreas. Sometimes infection participates in these changes and modifies the conditions. The first recorded observation of the invasion of internal parts of the human body by the colon bacillus was the case of multiple fat-necrosis which I reported to the Association of American Physicians in 1890. In the class of cases considered in Dr. Opie's paper we have to

[1] Contributions to the Science of Medicine, dedicated to W. H. Welch, p. 859, 1900.

reckon in the first instance with the obstruction to the outflow of the pancreatic juice, and in the second place, as a frequently important factor, with the invasion of bacteria in consequence of such obstruction.

November 5, 1900.

Dr. Welch in the chair.

Secondary Syphilitic Eruption. DR FUTCHER.

CASE 1.—The patient, a woman aged 34, was admitted on the medical side, October 17th, having previously been in the gynæcological ward since September 28th. Two weeks prior to her entrance into the hospital she had been complaining of pelvic pain, and after an examination the diagnosis of double salpingitis with a cystic ovary was made. The operation of vaginal puncture was performed October 1st and the cyst evacuated. I am indebted to Dr. Miller for permission to speak of the patient's condition while on the gynæcological side. She had had a slight fever previous to the operation, temperature going up to 101°, but contrary to expectation the temperature did not come down after operation but continued to rise until on October 3d it reached 103.2°. On that day she had a slight erythema of the skin and it was thought possible it might be some acute infectious disease. The following day Dr. Miller asked me to see the case with him but, though the eruption was still present, it was rapidly disappearing and seemed to have been nothing more than a temporary erythema. The patient was transferred, however, to the isolation ward to prevent any trouble in case our opinions should prove incorrect. The temperature then fell nearly to normal, being 99.2° on the morning of the 6th, but later the same day it ran up to 105.4°. In about 48 hours the temperature returned to normal and remained so for nearly 48 hours, when another paroxysm occurred, during which it reached 104.3°. It reached normal again in two days and she had another slight paroxysm which was followed subsequently by two other similar intermittent paroxysms.

The blood was examined on several occasions but no malarial parasites could be found. The leucocytes were repeatedly counted but there was no leucocytosis. Physical examination of all the organs was negative. We thought it might possibly be one of those obscure cases of Hodgkin's disease but there was no glandular enlargement. Her temperature now fell to nearly normal and continued so. The patient felt otherwise perfectly well and we allowed her to go home on October 23d.

On the 30th of October she came back with a perfectly typical macular, papular and pustular syphilitic rash on the face, arms and chest. Dr. Gilchrist was asked to see her then and diagnosed the case as one of secondary syphilitic eruption. I saw the patient yesterday and, the skin lesions still being present, I hoped to present the patient to-night. We found on investigating the history of the husband that he admitted exposure on July 4th, a primary sore on August 11th and a definite secondary skin eruption on August 28th, so there seems little doubt that in this case the temperature which gave us a great deal of anxiety was due to the syphilitic eruption.

A word or two in regard to such fevers may not be out of place. In the first place, it may be of a more or less continuous type; secondly, it may be of a remittent type, the temperature not reaching normal but remitting towards the normal point; and thirdly—and these are the most interesting cases—it may be of the typical intermittent type resembling closely one of the forms of malarial fever. It may precede the secondary skin eruption, as in this case, but most commonly it occurs coincidently with the eruption. It may occur, however, during the course of either the secondary or tertiary symptoms; the most common time for it to occur is at the onset of or during the course of the eruption.

This case presents one of the unusual forms of intermittent type and it is also of interest in that the fever came on at least 27 days before the onset of the secondary skin eruption.

A somewhat similar case is reported by Yeo in the *British Medical Journal* for 1884. His patient had a fever with daily exacerbations ranging over 5 or 6 degrees. It was of a more or less continuous, persistent type, lasting for about one month. It occurred between 25 and 30 days after exposure and practically a month before the onset of the secondary skin eruption.

This fever of syphilitic origin may also occur late in the disease and Sidney Philips has reported a case that illustrated this very well. His patient was a young woman married in 1879. Six months later she had definite secondary symptoms and nine years subsequently developed a tertian type of fever which lasted almost eight months. The patient had definite chills at the onset of the paroxysms and profuse sweats followed them. The fever was not influenced by quinine but immediately disappeared on the administration of potassium iodide and mercury.

Case 2. In this case the cause of the fever is not so evident. A boy, 12 years of age, was admitted September 26th complaining of pain in the arms, legs and back of the neck. Five or six days previous to this he had a definite chill, which was followed by a fever that continued up to the time of admission. He looked well, but had a temperature of 104.2°, and the joints, particularly the knees and elbows, were reddened and swollen. There was also a considerable degree of stiffness of the neck, and the head was rotated to the left side. He did not have Kernig's sign, one of the important symptoms of meningitis. He was started on the salicylates and the next morning, his temperature having dropped to 96°, we thought possibly it was nothing more than a case of acute rheumatism. The temperature went up again the next day, however, and from that time on ran a very irregular course, remitting at times and at others being definitely intermittent. The leucocytes have been persistently high, ranging from 11,000 to 36,000. Lumbar puncture was done on two or three occasions but with negative results. Blood-

cultures taken at different times gave no organisms until last Saturday, when a coccus was found which has as yet not been identified. The boy has had repeated attacks of arthritis and at present there is some evidence of involvement of the apex of right lung. What the nature of the case is, it is difficult to say.

November 23, 1900. An interesting development occurred in this case on November 5th. On this date the highest temperature reached was 104.9°. The mere possibility of the fever being syphilitic in origin was entertained, and potassium iodide in 8 grain doses, three times daily, was commenced. The next day the boy's temperature reached normal and has remained so since. While we have not yet obtained any positive evidence of lues in the boy or his parents this therapeutic test is extremely suggestive.

Discussion.

Dr. Osler.—The question of intermittent fever in syphilis is very interesting and was brought forcibly to our notice here by a remarkable case. An army officer was admitted with obscure symptoms after having been under treatment in other cities for some time. He had rise of temperature every day or every second day to 103° or 104° without any other symptoms. When he reached his ward the diagnosis was ready, however, as he had then developed the eruption.

Last year we had an interesting series of syphilitic fevers, several of them occurring quite early in the disease, one a markedly intermittent case and one a very continuous fever during the early stage of the disease.

Observations on Blood in Typhoid Fever. Dr. Thayer.

(See Vol. VIII, No. XIX, Johns Hopkins Hospital Reports.)

Discussion.

Dr. Welch.—The points brought out by Dr. Thayer concerning leucocytosis in experimental bacterial infections are particularly well illustrated in the infections of rabbits with Micrococcus lanceolatus, as I found several years ago when engaged in the study of this micro-organism. Every degree of virulence may be possessed by cultures of this micrococcus obtained from different sources. With maximum virulence of the organism and high susceptibility of the animal, death may follow experimental inoculation in 16 to 24 hours. In these cases there is progressive diminution in the number of leucocytes up to the time of death. With less virulent micrococci and greater resistance of the animal, death may be delayed for several days. There are then usually inflammatory exudates at the site of inoculation and often elsewhere, and now there is marked leucocytosis. Sometimes the animal survives nothwithstanding evidence of severe infection, and in these cases I found the count of the leucocytes a valuable index to the probable issue of the infection.

Albumosuria. Dr. Hamburger.

(To appear in a later number of the Bulletin.)

November 19, 1900.

Exhibition of Pathological Specimens: Vegetative Endocarditis, Cystic Kidney, Carcinoma of Gall-Bladder. Dr. Marshall.

The specimens I have to exhibit are a heart from one case and a liver and kidney from another. The heart specimen is particularly interesting. It is seen that two valves are affected, the mitral and the aortic. Upon examining the mitral valve, in addition to the fresh vegetations, one finds several firm, organized vegetations along the line of closure, and several of the chordæ tendineæ are ruptured and thickened. Attached to some of the chordæ are small nodules of dense fibrous tissue. From this condition it is evident that there has been a former attack of acute endocarditis from which the patient has recovered.

There are no old vegetations on the aortic valve or on the ventricular surface of the mitral valve.

The largest of the fresh vegetations are on the ventricular surfaces of the posterior and left cusps of the aortic valves. These vegetations have been somewhat injured in preparing the specimen, but at the autopsy they formed a mass projecting about 2 cm. from the under surface of the valve. At the base of the vegetation is a large ulceration through the left aortic leaflet. From this most prominent lesion, a row of small fresh vegetations extends up into the sinus of Valsalva, and also down over the ventricular surface of the mitral leaflet to its free border. A few small recent vegetations are also present along the line of closure of the mitral valve.

From the extent of the lesion on the aortic valve, and from the fact that the vegetations grow fewer and smaller the further they are situated from the aortic valve, it seems probable that the acute endocarditis started on the aortic valve.

In addition to the chronic and acute valve lesions there is general cardiac hypertrophy and dilatation, and adherent pericardium, and, finally, a moderate degree of fibrous myocarditis.

It may be noted that the orifices of the heart are of smaller circumference than normal:

The aortic orifice measuring	6.5 cm.
The mitral orifice measuring	9.0 cm.
The pulmonary orifice measuring	8.5 cm.
The tricuspid orifice measuring	12.0 cm.

Dr. Harris found streptococci in coverslip preparations and in cultures from the fresh vegetations, and in sections stained by the Gram-Weigert method masses of cocci can be seen at the edge of the vegetations. Nothing more of interest was found at autopsy. No infarcts were discovered.

The most important recent work upon endocarditis that I have found is by Harbitz in the Deutsche medicinische Wochenschrift, 1899, No. 8, S. 121-124.

He divides the endocarditides into infectious and non-infectious, the latter associated with carcinoma or other cachectic conditions.

Out of 43 cases of infectious endocarditis, Harbitz demon-

strated bacteria in 33, the relative frequency of various organisms being:

Streptococci	39.5%	17 cases.
Staphylococci	18.6%	8 "
Pneumococci	11.6%	5 "
Other organisms	6.9%	3 "
No organisms	23.2%	10 "

The 10 cases without organisms were cases of healed infectious endocarditis, such as is seen on the mitral valve of the specimen shown to-night.

Harbitz subdivides the infectious endocarditides into pyæmic and non-pyæmic. He finds that the staphylococci most often cause pyæmic endocarditis, giving the clinical picture of pyæmia and, anatomically, showing ulceration of the valves and metastatic abscesses.

The non-pyæmic variety is usually due to the streptococcus or pneumococcus. Of his 16 cases of this form of endocarditis, in 9 Harbitz found streptococcus, in 4, pneumococcus and in 2, an unidentified organism.

In this group of cases the disease may last longer, and the vegetations tend to be larger and to spread into the auricles and ventricles. The emboli are not suppurative. Harbitz does not consider this classification absolute, but states that the same organism may produce any type of endocarditis, from the mild vegetative to the pyæmic, ulcerative form.

The specimen shown to-night conforms more closely to Harbitz's non-pyæmic type of endocarditis; the vegetations show the streptococcus, they are very large, they tend to spread quite widely, and there are no suppurative emboli. The specimen approaches Harbitz's pyæmic type in showing ulceration of the aortic valve.

The other two specimens shown to-night are from an autopsy performed a few days ago at Bayview. One is a congenital cystic kidney, the other carcinoma of the fundus of the gall-bladder, with metastases to the adjacent surface of the liver and to the lymph-glands along the bile-ducts.

DISCUSSION.

DR. WELCH.—Dr. Marshall has referred to the interesting observations of Harbitz of Christiania, who distinguishes Staphylococcus endocarditidis from those caused by streptococci, pneumococci and other bacteria. According to Harbitz, staphylococci are the principal infectious agents in acute ulcerative endocarditis, whereas the other micro-organisms cause the more chronic and warty forms of endocarditis with non-suppurating infarcts, these latter forms being the more common.

It would be interesting to analyze our cases with reference to this classification of Harbitz. When some years ago I went over our autopsy-protocols, I found that streptococci first and pneumococci in the second instance were most frequent in endocarditis, but staphylococci were occasionally met, and in addition there is quite a long list of other bacteria sometimes present in the vegetations, among the latter, gonococci, Micrococcus zymogenes of MacCallum and delicate, slender bacilli resembling the influenza bacillus being of especial interest. I do not recall that staphylococci were responsible for peculiarly malignant types of the disease, and certainly streptococci were present in some of the instances of genuine ulcerative endocarditis. The efforts to associate definite species of bacteria with the various clinical and anatomical types of endocarditis have upon the whole yielded disappointing results, the same micro-organisms being found in the milder warty forms of the disease as in the acute ulcerative varieties. In the light of Harbitz's conclusions it seems important to continue the studies along these lines. One point is of interest, viz.: that emboli containing streptococci may cause bland, or at least non-suppurative infarcts.

Congenital Absence of Pectoralis Major and Minor. DR. RUSK.

(To appear in a later number of the BULLETIN.)

Report of Gynæcological Cases. DR. MILLER.

CASE 1.—*Simple Ulcerative Colitis.*—I intended to report this case because I thought I had cured it by applications to the lower part of the bowel, but since the program was printed I have had occasion to examine her again and find that the ulcers have returned. The patient was a young woman, 25 years of age, who about 14 months ago began to complain of diarrhœa. She had no nausea or vomiting but the bowels were moved from six to twelve times a day, the stools being dark-colored and offensive. Her mother and several other persons in the neighborhood who use the same drinking water were affected in somewhat the same way although not so severely. She was treated in the usual way and, according to her statement, was kept in bed for about six weeks, receiving medicines by the mouth, and irrigations. She would improve somewhat but as soon as she got on her feet again the diarrhœa returned.

She entered the hospital September 4th and was examined by Dr. Hunner, the patient being placed in the knee-chest position and the bowel examined by means of the long speculum. Examinations for ameba proved negative. Numerous ulcers were found and the cultures from these gave a great variety of bacteria but nothing characteristic. A curetting was done and the debris examined under the microscope but without showing anything very definite.

Dr. Hunner has drawn here a description of some of the ulcers as seen at the first examination. They were horse-shoe-shaped, about 2 cm. from one end to the other and about 5 or 6 mm. across the narrow portion with a granular-looking base and very little congestion in the neighborhood. In his description of the findings it was noted that there was marked congestion extending up to the sigmoid. The areas of involvement had very much the appearance of ringworm.

The patient was put to bed, given a milk diet, and silver nitrate irrigations were administered in varying strength. After a month of this treatment without improvement the patient was placed in a knee-chest position, the speculum inserted and a piece of iodoform gauze saturated in a 10 per cent ichthyol solution was placed in the bowel and allowed

to remain one hour. After the first application she had a number of stools, but on the following day had them only after the irrigations. After about six applications she had no stools except those following applications or irrigations, and an examination of the rectum showed that the ulcers had disappeared. On Wednesday last, Dr. Kelly saw her again and found a few small ulcers, and when I examined her again to-day I found her condition to be almost as bad as at first. We shall continue the same treatment and report results later.

Case 2.—This case presents simply a rather unique way of dealing with large oozing raw surfaces where the intestines might become adherent and cause trouble. The patient, a woman aged 60, entered the hospital October 19th with a large tumor in the left side of the pelvis. The diagnosis was made of a possible carcinoma of the left ovary with adhesion of the structures around it. An incision was made and a large tumor was found springing from the left ramus of the pubes. It was not connected in any way with the ovary or tube and examination proved it to be a fibroma. We tied off a good many of the blood-vessels coming from the abdominal walls and tried to cut through the capsule of the tumor in order to shell it out. In trying to do this on the right side the scissors entered an open space, apparently in the capsule, but instead we incised the bladder for about 8 cm., making a triangular cut. The tumor was finally enucleated and it left the whole anterior part of the pelvis a raw surface. This raw surface in front of the uterus could not be covered with peritoneum, and it was a question at first how to cover it so as to prevent the intestines becoming adherent. We began on the left side and sutured the round ligaments up to the anterior abdominal wall and then the uterus was stitched to the wall by interrupted sutures. The same plan was carried out on the right side and, after closing the bladder wound, the oozing area was packed with gauze. In this way the abdominal cavity was cut off entirely from this oozing space in front of the uterus. The result justified the means, because the patient recovered without any serious complications.

Demonstration of a New Hemoglobinometer. Dr. Arthur Dare, Philadelphia.

Through the kindly interest manifested by Professors Flexner and Hare, I have the honor of presenting a new instrument for estimating the quantity of hemoglobin in blood by an improved means. The application of the instrument differs from that operative in the popular instruments of Von Fleischl, Gowers and Oliver, by using blood unmixed with artificial serums. The method consists in ascertaining the percentage of hemoglobin by comparison of the color of the blood arranged into a thin film of measured thickness with a fixed standard color equally illuminated by transmitted candle-light.

The essential parts of the instrument are an automatic pipet for collecting the blood, and a graduated color comparison to measure the percentage of hemoglobin therein contained. The pipet for collecting the blood is composed of an oblong plate of white or opal glass, into the end of which is ground a depressed surface exactly parallel with its plane surface, and of measured depth. This depression forms a very shallow capillary chamber when the transparent glass is placed over it and the two are clamped tightly together with a pipet-clamp. This space fills automatically by capillary attraction when either of the three free edges is touched lightly to the blood drop. When filled the pipet is placed upon the stage of the instrument and held in position by grooves, and is then compared with a color comparison composed of a semicircle of tinted glass, the periphery of which represents an increasing shade of color from apex to base. This is secured to a disc of opal glass which serves the same purpose as in the pipet, disperses the light and furnishes a white background against which the color shades are best appreciated.

The blood and comparison placed horizontally side by side are viewed through achromatic lenses fitted into the telescoping camera-tube, and the comparison adjusted by means of a milled head, which in turn rotates the color prism until the same corresponds in color with the blood. The operation is completed by noting the percentage of hemoglobin indicated.

As the examination only consists of filling the pipet and comparing the color shade with the comparison, the time required for an observation is reduced to the minimum of 1 or 2 minutes, which places hemoglobin estimation among the practical clinical methods.

We will consider the instrument from the aspect of the scientific hematologist.

By using a stratum of blood the thickness of which is always constant, we avoid the volumetric character of all dilution methods. It is evident that if the ends of the column of blood contained by the pipet are either concave or convex, or if the outside is soiled, an error must result.

As the blood film is viewed against an illuminated white background, leucocytosis is imperceptible; only the red color of the hemoglobin is visible.

With the Fleischl the error due to leukocytosis is considerable, as the blood and water mixture is turbid, and does not compare with the clear tone of the color comparison, making the readings low, while in leukopenia they are high.

Again, by using undiluted blood we avoid the dilution color curve; to illustrate, an equal volume or weight of normal 100 per cent blood and water, instead of reading 50 per cent reads 65 per cent; this discrepancy is the color curve. In every different sample of blood which is an intravascular dilution, we have a color curve due to different degrees of hemoglobin concentration; this color curve is likewise adjusted by keeping an equal concentration of coloring matter in the blood film and color comparison; *e. g.*, blood reading 100 per cent requires greater concentration of color, hence a thicker stratum of colored glass to give an equal shade, than a film containing 20 per cent of hemoglobin.

We keep the focal distance of all observations uniform by using achromatic lenses and a fixed camera-tube and obtain a large field from apertures that cover only 3 per cent of the comparison disc, against 20 per cent in the Fleischl. We also have darker shades to compare, an operation less difficult than with delicate tints.

The instrument can be used in daylight by directing the line of vision toward a dark surface, as a black coat that does not reflect light. I frequently use it in the hospital wards where the brightness of daylight is intensified by the whiteness of walls and linen.

If the colors do not look alike daylight either direct or reflected is entering beside the candle flame, the yellow light of which only in a measure occludes the violet rays of the solar spectrum.

Five hundred comparative examinations with the instruments of Von Fleischl, Oliver and this instrument show readings always very close to the Oliver.

With the Von Fleischl the results are at variance in low hemoglobin percentages, in leukemic blood and in blood showing leukocytosis.

As it is occasionally desirable to keep the blood in the pipet fresh a long time a special pipet is made that protects the edges of the blood film from exposure to air, except at two minute points, which are provided for capillarity. This is not so readily cleansed but is convenient for demonstration.

In testing the various methods available with undiluted blood, viewing the blood film and color comparisons placed side by side by doubly reflected light (as is used in the Oliver instrument) was finally abandoned for the much more satisfactory method of illumination of the blood as the most perfect means of color analysis.

An attempt was also made to estimate the hemoglobin through the ear-lobe by illumination with a greater degree of success than would at first seem possible.

In conclusion, I desire to point to the practicability of the instrument. The application requires but 1 or 2 minutes, and no special technical skill to operate. Accuracy is not sacrificed to celerity; on the contrary the results in successive trials are constant and more uniform than with dilution methods.

In testing the instrument with the view to determining the degree of variations known to exist in colorimetric observations with other instruments, experiments were made with clinical patients whose knowledge of the instrument only extended so far as being able to arrange the colors until the tone agreed; variations of more than one or two per cent were very infrequent; with shop girls, accustomed to the matching of color shades, the readings were still more uniform, points that class it as a most valuable instrument of precision.

I would also call attention to the blood-lancet that accompanies the instrument. A bayonet-pointed needle is held by a simple chuck mechanism to any desired length from the hard-rubber guard fixed or released by a turn of the metal collar. The needle can be removed for sterilization or replaced by another needle in case the point is damaged or corroded.

December 3, 1900.

In the absence of the president, Dr. Jacobs in the chair.

Cirrhosis of the Stomach. DR. MCCRAE.

Dr. Osler is unavoidably absent this evening, and as he would probably prefer to report personally one of the cases he had intended showing this evening, I will merely present the specimens from the other case.

The case is supposed to be one of cirrhosis of the stomach, a rare condition. Unfortunately, Dr. Osler has notes of the case with him and I can only speak from my own recollection of them. The patient was about 48 years of age and his symptoms began about five years ago in a rather sudden way. It is curious how many patients complain of acute gastric trouble beginning after a period of overheating and the drinking of cold beer. Such was the history in this case. The patient gradually lost weight for some time though he did not suffer from nausea or vomiting. About a year ago he came to the hospital and his case was diagnosed as one of carcinoma of the stomach. He had then considerable emaciation, moderate anæmia and a slight ridge in the abdomen with a sense of resistance but no definite tumor. There was absence of free hydrochloric acid and the presence of lactic acid.

About two months ago he consulted Dr. Osler. His history was practically the same as before with one additional symptom, namely that in the last year he had been able to take only a definite small amount of nutriment at one time, becoming nauseated whenever he exceeded this quantity, and, that small amount was decreasing constantly. He had then lost over 100 pounds in weight. The test meal, which we finally succeeded in getting, was rather unusual in that it showed 90 per cent of fluid, a total acidity of only 10 and the total absence of free acids. Upon the long duration of the case and the above history, Dr. Osler based his diagnosis of cirrhosis of the stomach.

Dr. Finney, at the operation, found practically an hour-glass constriction of the stomach. An opening was made in the stomach-wall and at first it was impossible to pass a finger beyond the stricture. A small probe was used, then a larger one and so on until finally two fingers could be passed and the stricture was then dilated. The wound was closed in the usual way but the patient did not do well, gradually sank and died four days later, apparently from inanition.

The specimen is here. Sections removed at the time of operation show a great overgrowth of tissue and no sign of malignant disease or of previous ulcer. Cirrhosis ventriculi is a rare condition and the diagnosis is rarely made during life with any degree of certainty.

Abdominal Tumor containing a Dermoid Cyst. DR. MITCHELL.

The case was one of a young man, 34 years of age, who gave a history of the presence of colicky pains in the abdo-

men during the past ten years. During the past five years these pains have increased in severity. Three years ago he first noticed a tumor about three or four inches just below the umbilicus, and under the impression that it was a floating kidney, an exploratory incision was made to-day, and a dermoid cyst in the mesentery of the ilium was found. (A fuller account will be published later.)

Discussion.

Dr. Futcher.—In regard to the question of diagnosis of this case, the possibility of its being other than a displaced kidney was entertained. Dr. Osler, as well as Dr. Finney, spoke of the possibility of its being a mesenteric tumor or a tumor in connection with the bowel but it seemed to conform more to the general character of a floating kidney, although its shape was not exactly that of a normal kidney. Personally, I thought it was a displaced kidney, but Dr. Osler was rather non-committal. Dr. Young made a cystoscopic examination and found the flow of urine from the two ureters to be normal. This should have impressed us more strongly than it did as to the probability of its not being a kidney tumor.

Dr. Bloodgood.—There have been three other dermoids on the surgical side during the last ten years, although very few tumors of the mesentery itself. Two of the dermoids were in men of about 30 years of age and the patients had not been aware of their existence for any length of time. Both were opened and drained. Both were behind the peritoneum and the autopsy on one proved that the tumor could not have been removed. The third cyst was, I think, in practically the same location as in the case reported by Dr. Mitchell, but it was adherent to the bladder and was associated with attacks of hematuria. It was demonstrated later that a carcinomatous growth had been engrafted upon the cyst.

Two Cases of Acute Pancreatitis. Dr. Bloodgood.

The first case has been reported by Dr. Thayer and the second is a recent one that Dr. Mitchell and I saw together with Dr. Futcher. The disease is so rare that I think the few of us fortunate enough to see it should be good enough to bring it before the majority. The diagnosis is not often made, but I believe an early diagnosis followed by operation would in the majority of instances be followed by recovery. In the last ten years we have had some 12,000 surgical admissions to this hospital and probably as many more on the medical side, but we have only seen in all that number three cases of pancreatitis; one hemorrhagic and two suppurative. As I had had the good fortune to see the first case the diagnosis of the second was not difficult.

The patient was a physician, 47 years of age, whose only previous illness consisted in symptoms of indigestion with pain after eating associated with slight distension and rarely nausea and vomiting. Seven months previous to his last attack he had with one of these spells a condition of jaundice which lasted three weeks. The onset of the last attack, 18 days before coming to the hospital, was sudden and associated with nausea, vomiting and intense cramp-like pains all over the abdomen. After five days of this, his abdomen was slightly distended but there was no area of tenderness. The vomiting was worse during the first 24 hours and only present at intervals after that. On the third day his temperature was high, for the first time reaching 101.5°. On the seventh day his physician noticed a mass in the right lumbar region but he does not give the location very definitely. He then began to have irregular fevers and chills and throughout the entire attack the abdominal pains were present but not very marked except during the first day. There was no jaundice.

The tumor was visible only to the right but was palpable some distance to the left of the median line. There was a leukocytosis of 19,300. The patient remained under observation for three days with very little change in his condition except that he was growing weaker and slightly delirious. When I saw him he was in a toxic condition and looked very ill. The surface over the tumor was very irregular, like that of the omentum around an acute appendicitis. The mass was large and immovable at that time and all around the tumor a tympanitic note was obtained on percussion. The position of the tumor corresponded with that of the first and was different from that of appendicitis or other tumors in the abdomen.

At the operation, performed under cocaine, there was found to be a great deal of fat and the omentum was studded with areas of fat-necrosis. The tumor was adherent to the parietal peritoneum, and a tendency to bleed was noticed but there was no hemorrhagic area. The mass under the omentum was hard and everything about it bled easily when separated. For that reason the knife was not used but the fingers were employed to separate the parts. When pus was found it was first yellowish and then of a deeper brown color like chocolate. There were at least 250 cc. and it seemed to come from numerous pockets. The man died within 12 hours after the operation, which seemed to have no particular effect on his condition.

Discussion.

Dr. Opie.—In Dr. Bloodgood's case the autopsy showed an abscess occupying the site of the lesser peritoneal cavity. The incision made at the operation passed through the greater omentum between the stomach and transverse colon and the drainage tube entered a large cavity lined with necrotic fat. The tumor mass felt during life was not the pancreas but spongy brownish-red material which lay in front of it and on examination proved to be changed blood. The orifices of the common duct and pancreatic duct were separated by a thin membrane; a gall-stone was lodged in the common duct near its orifice in contact with this membrane and therefore in such position that it could compress the pancreatic duct. The pancreas was the seat of beginning chronic interstitial inflammation and there was evidence that hemorrhage had occurred into and about it. In thirty-one reported cases I found that acute lesions of the pancreas

have been associated with the presence of gall-stones, and in seven of these cases a stone occupied a position similar to that just described. In four of these seven cases the symptoms were very acute, and death occurred within 48 hours; the autopsies showed infiltration of the pancreas with blood. It is difficult to say whether the condition was a simple hemorrhage or a hemorrhagic inflammation. It seems probable that in this case the stone lodged in the common duct occluded the pancreatic duct. As the result of subsequent changes hemorrhage occurred into and about the gland. The patient survived the primary lesions and thus gave opportunity for secondary infection resulting in a peri-pancreatic abscess.

Tuberculosis of the Aorta. MR. LONGCOPE.

The patient was a colored child admitted to the Johns Hopkins Hospital November 9, 1899, and a diagnosis of tuberculosis of the hip was made. On examination the heart and lungs were found normal. The cervical lymph-glands were palpable. On November 11th an incision of the sub-

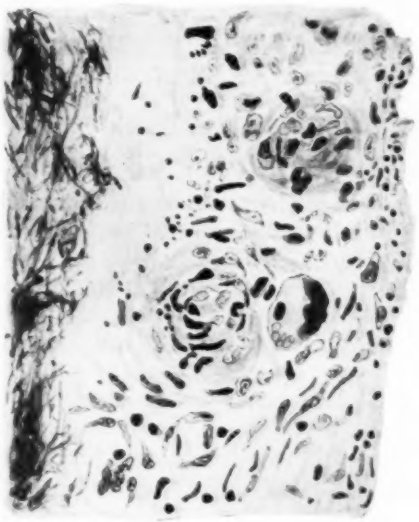

FIG. 1.—Small tubercles at the margin of the necrotic mass. The section is from the lower end of intima.

gluteal abscess and arthrotomy were done. The wound healed well and the child remained in good condition until January 10, 1900, two months after the operation, when a cough was noticed. A few days later on, January 20th, the child's temperature, which had been practically normal, rose to 103°, and an examination of the lungs showed patches of consolidation in the left apex and both lower lobes. From this time the patient's temperature was more or less elevated and occasionally reached 104°. The patient grew steadily weaker and died on March 3, 1900, almost four months after the operation.

The anatomical diagnosis made at the autopsy reads—*Tuberculosis of the hip: abscess formation in the muscles anterior to the acetabulum; chronic tuberculosis of the right lung; miliary tuberculosis of the lungs, liver and spleen; acute splenic tumor; hyperplasia of the lymphatic glands and lymphatic tissue in the intestines; mural thrombus of the aorta.*

The chronic tuberculosis of the right lung consisted in a caseous patch about 5 cm. in diameter at the apex of that lung. Although the kidneys showed no distinct tubercles macroscopically, still on microscopic examination aggregations of epithelioid and lymphoid cells were found which strongly suggested tubercle. The thrombus was situated on the posterior wall of the lower abdominal aorta, and consisted of a polypoid projection about 3 cm. in length, bent downwards and closely hugging the wall of the aorta. At its lower extremity a fresh red thrombus mass was attached.

A section of the lesion in the aorta shows that the nodule is composed of a mass of necrotic granular material, containing no cell elements. It is surrounded, except at its lower extremity, by intimal tissue, and presents much the appearance of an ordinary atheromatous placque. On close examination, however, the lining intima is found to contain epithelioid and lymphoid cells which at its lower extremity arrange themselves into two definite tubercles containing giant cells (Fig. 1). About the periphery of the necrotic granular material and beneath the intimal border are seen masses of fibrin. Near the intima the fibrin is continuous with radially placed cells of an epithelioid type. The necrotic mass itself contains great numbers of tubercle bacilli, which stain with carbol fuchsin, and are not decolorized after treatment with 10 per cent nitric acid for half an hour. These bacilli also stain well in alkaline methylene blue. The entire lesion of the intima, then, must be considered a chronic tuberculosis with marked caseation.

The media, on the other hand, presents a different picture. Directly beneath the lesion in the intima, masses of lymphoid and epithelioid cells with a few giant cells are seen in the media. There is no definite arrangement of these cells suggestive of tubercle. At one point the growth in the media and the caseous mass in the intima are separated only by a few elastic fibres, but in greater part the lesion is confined to the middle portion of the media. Numerous blood-vessels are seen running through the diseased portion. Weigert's elastic fibre stain shows that the elastica has been greatly damaged. The tuberculous process has broken the elastic fibres into small pieces which appear as short curled threads. The lesion occupying the mid portion of the media pushes outward, and at its margins widely separates the elastic fibres next the adventitia. These fibres are often broken and their ends sharply bent outward. In no place does the growth in the media extend into the adventitia, and, except for increased vascularity and slight thickening, this coat appears practically normal.

Few cases of tuberculous aortitis have been reported; whereas tuberculosis of the veins and smaller arteries seems to be of comparatively frequent occurrence. In 1882, Weigert, in an article on tuberculosis of the veins in Virchow's Archives, describes two cases of miliary tuberculosis of the aorta which Marchand and Huber showed him. In

the same volume of the Archives Schuchardt mentions a case of miliary tuberculosis of the abdominal and thoracic aorta occurring in a case of general miliary tuberculosis. Eight subsequent cases have been reported in Germany and France by Dittrich, Hanot, Kamen, Hanot and Lévy, Hanau and Sigg, Buttermilch and Benda; and three cases in America, one by Dr. Flexner, a second by Dr. Blumer, and Dr. Welch, in his article on Thrombosis and Embolism, mentions a third case shown to him by Dr. Gaylord.

These fourteen cases can be divided into two groups: those in which there is a primary tuberculosis of the intima caused by a direct deposition of the bacilli from the blood stream, upon the endothelium of the aorta; and those in which the adventitia is the seat of primary invasion with an extension of the process into the media and intima. Ten of the fourteen cases belong to the first group, and in this group also the present case should be included. In all the cases of this group of primary infection of the intima, except that reported by Stroebe, the tubercles were either miliary or exceedingly fresh. In Stroebe's case, however, a caseous polyp surrounded by epithelioid cells was found projecting from the intima of the ascending aorta. This polyp was capped by a thrombus mass. The present case closely resembles that of Stroebe.

Of the four cases of group II, the primary involvement of the adventitia occurred in the following manner: Twice, *i. e.* in the cases of Dittrich and Kamen, a caseous lymph gland was found adherent to the adventitial wall of the aorta, and the tuberculous process could be traced directly from this focus into the media and intima. Hanau and Sigg describe a portion of a tuberculous lung adhering to the arch of the aorta. A small aneurysm of the aortic wall projected into a tuberculous cavity of the lung. The aneurysm was filled with a thrombus mass. Tubercle bacilli were found in the thrombus and artery wall. In the fourth case of this group Buttermilch traced the aortic tuberculosis from a chronic tuberculous focus in the thoracic vertebræ. The aorta and vertebræ were firmly adherent, and small caseous abscesses were found in the adhesions.

In connection with the present case it is interesting to note Benda's views concerning the part played by tuberculosis of the blood-vessels in general miliary tuberculosis following operation or injury of tuberculous joints and bones. In three of such cases he finds tuberculosis of the blood-vessels, and he believes that during the operation or injury a few bacilli make their way into the circulation and lodge upon the intima of some blood-vessel, thus forming as it were a tuberculous metastasis. At this time there is no general invasion of the bacilli. In the intima of the vessel a tubercle develops, becomes caseous and finally ruptures, liberating great numbers of tubercle bacilli into the circulating blood. These bacilli are distributed throughout the body and are the direct cause of the general miliary tuberculosis.

Since in the present case the aortic tuberculosis is the only chronic process except the focus in the right lung, it is not impossible that the general miliary tuberculosis may have been directly caused by the rupture of the caseous tubercle of the intima.

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NOTES AND NEWS.

Dr. John S. Billings, Jr., Assistant Resident Physician at the Hospital during 1892, '93 and '94, resides at 32 East 53rd St., New York City. He is Assistant Director of the Bacteriological Laboratory of the Department of Health, having resigned his position of Instructor in Clinical Microscopy in the University and Bellevue Hospital Medical School.

Dr. C. N. B. Camac, Assistant Resident Physician at the Hospital during 1896, '97 and '98, resides at 108 East 65th St., New York City. He is Visiting Physician to the City Hospital, and Instructor in Clinical Pathology at the Cornell Medical School.

Dr. E. P. Carter, Assistant Resident Physician at the Hospital in 1894 and '95, resides at 8 Hayward St., Cleveland, O. He is Lecturer on Medical Jurisprudence in the Western Reserve University Medical School, a member of the staff of the City Hospital, and an Assistant in the Out-Patient Department of the Lakeside Hospital.

Dr. Edmund D. Clark, Assistant Resident Surgeon at the Hospital in 1895, resides at Indianapolis, Ind. In 1896 he was appointed Demonstrator of Histology in the Medical College of Indiana; in 1897, Adjunct Professor of Physiology and Surgical Pathology; in 1898, Consulting Surgeon of the City Hospital, and in 1899, Instructor in General Surgery at the Protestant Deaconess Hospital.

Dr. George Edward Clark, Assistant Resident Surgeon at the Hospital in 1889 and 1890, resides at Skaneateles, N. Y.

Dr. John G. Clark, Resident Gynecologist at the Hospital in 1895 and '96, has been appointed Consulting Gynecolo-

gist to the Woman's Hospital, Philadelphia. He resides at 218 South 15th St.

Dr. Malvern B. Clopton, Assistant Resident Surgeon at the Hospital in 1898, resides at 3732 Olive St., St. Louis, Mo., and is connected with the Medical School of the Washington University.

Dr. Theo. Coleman, Assistant Resident Surgeon at the Hospital in 1895 and '96, who now resides at 569 Spadina Ave., Toronto, Ont., has been appointed Head Surgeon and Physician to the Canadian Copper Company, at Copper Cliff.

Dr. J. Colton Deal, Assistant Resident Obstetrician at the Hospital in 1898, resides at 5301 Haverford Ave., Philadelphia. He is Pathologist to the Gynecological Department of the Polyclinic Hospital.

Dr. George W. Dobbin, Assistant Resident Obstetrician at the Hospital from 1894 to '97 and Resident Obstetrician from 1897 to '99, has been appointed Professor of Obstetrics in the College of Physicians and Surgeons of Baltimore. He resides at 923 N. Charles St., Baltimore.

Dr. W. W. Farr, Assistant Resident Gynecologist at the Hospital in 1890 and '91, resides at 5728 Greene St., Philadelphia, Pa.

Dr. McPheeters Glasgow, Assistant Resident Gynecologist at the Hospital in 1896 and '97, resides at 151 N. Spruce St., Nashville, Tenn., and is connected with the Vanderbilt Medical School.

Dr. Francis R. Hagner, Assistant Resident Surgeon at the Hospital in 1896, resides at 1717 N St., Washington, D. C. He has charge of the Surgical Dispensary at the Garfield Hospital, and is Instructor in Bacteriology at the Columbian University Medical School.

Dr. Hunter Robb, Resident Gynecologist at the Hospital from 1889 to 1894, resides at 1342 Euclid Avenue, Cleveland, O. He is Professor of Gynecology at the Western Reserve University, and Gynecologist-in-Chief to the Lakeside Hospital.

Dr. Chauncey P. Smith, Assistant Resident Surgeon at the Hospital in 1893 and '94, resides at 90 N. Pearl St., Buffalo, N. Y.

NOTES ON NEW BOOKS.

Cancer of the Stomach: A Clinical Study. By WILLIAM OSLER, M. D., and THOMAS MCCRAE, M. B. (Tor.), of the Johns Hopkins Hospital, Baltimore. With illustrations. (*Philadelphia: P. Blakiston's Son & Co., 1900*).

The prevalence of cancer of the stomach, and the value to the physician of a thorough knowledge of the clinical features of the disease, as well as the importance to the patient of its early recognition, makes this admirable monograph a welcome acquisition to our literature on the subject.

The monograph contains 157 pages with several illustrations in the text. It is essentially a critical study of 150 cases of primary cancer of the stomach admitted to the Johns Hopkins Hospital from its opening, May 5, 1889, until March 31, 1898. Of these, 2 were instances of multiple primary cancer. During the same period 3 cases of secondary cancer of the stomach came under observation, and these are considered separately. The literature has been carefully examined and much additional information thus added.

The authors believe there is evidence that cancer in general is on the increase. They hold, however, that there is not sufficient proof at hand to warrant the same conclusion concerning cancer of the stomach. The general etiology of the disease is then taken up. The ratio of the disease in males and females was 5 to 1. The greatest number of cases occurred in the fifth decade. The white and colored race are apparently about equally liable. The ratio of the disease in the two races was respectively 6.9 to 1. The ratio of admissions is 6 to 1. In only 6 cases was there a family history of cancer. There was a history of ulcer of the stomach in 4 cases. Trauma seemed to bear a causal relationship to the onset of the disease in only one instance.

An interesting chapter is devoted to cancer of the stomach in the young. The writers give 30 years as the convenient dividing line below which cancer of the stomach may be considered as occurring in the young. They have collected from the literature 6 authentic cases in the first decade and 13 in the second. The number of cases which are reported as occurring in the third decade is much larger and forms an interesting group from the standpoint of diagnosis. All their cases below 30 were in the third decade, the youngest patient being 22 years of age. There were 6 cases, or 4 per cent of the total, in this decade, and they consider this number unusually large. An important feature of the disease in the young is its rapid progress.

General instructive chapters are devoted to an analysis of the symptoms present in the 150 cases. An interesting feature was the surprisingly large number of patients who gave a history of an acute onset. There were 37 cases in which the onset could be termed sudden. The three most constant symptoms were pain, vomiting and tumor. Pain occurred in 130 cases, or 86.6 per cent.; vomiting in 128 cases, or 85.3 per cent.; tumor in 115 cases, or 76.6 per cent. In 87 cases in which stomach contents were obtained for examination, there was an absence of free hydrochloric acid in 80, or 92 per cent. There were seven cases in which free hydrochloric acid was found. In the series, lactic acid was examined for in 73 cases and was found present in 55, giving 75.3 per cent. The writers consider that Uffelmann's test for lactic acid is satisfactory, laying stress on the fact that an ethereal extract should be used in making the test.

Certain associated and secondary symptoms are then taken up. Perforation into the peritoneal cavity or adjacent portions of the intestinal tract occurred in 6 cases. In 2 cases there were secondary metastases at the umbilicus. Jaundice was present in 6 and ascites in 8 cases. Thrombosis of the left femoral vein occurred in 2 cases. Thrombi were found post mortem in 3 cases. There was one remarkable case in which thrombosis of fourteen or fifteen veins was found.

Some of the most interesting chapters are devoted to the study of the different features associated with the site, shape, structure and character of the tumor, which was made out in 115 cases. The importance of inspection of the abdomen is emphasized. In 42 cases the stomach was dilated, the dilatation in each case being visible to the naked eye. The atrophic form of carcinoma ventriculi was present in 12 cases, and was recognized in 6 during life.

A chapter is devoted to the blood in cancer of the stomach. It is rather disappointing to find that in the cases in which the blood was examined for a digestion leucocytosis, the absence of such a leucocytosis was not by any means a constant feature. In 22 cases thus examined it was present in 10 and absent in 12. They are inclined to the opinion that little reliance can be placed on the digestion leucocytosis from a diagnostic standpoint.

The disease was latent in 8 cases and was unsuspected during life. Autopsies were obtained in 46 cases. The following figures give the frequency of involvement of the various regions of the stomach: Pyloric region, 24; general involvement, 6; lesser curvature, 5; greater curvature, 3; cardia, 3; posterior wall, 3; fundus, 1.

The monograph concludes with the therapeutic management of the disease. The medical treatment is palliative and is intended for those cases which are beyond surgical interference. The surgical treatment is radical or palliative. The writers state that an exploratory operation should be more frequently advised. They hold that results from the radical procedure in recent years are encouraging, and believe that the future should show a marked increase in the percentage of recoveries. In this connection they emphasize the great importance of an early diagnosis of the disease. The palliative surgical measures are undertaken to overcome the effects from stenosis of one or other of the cardiac orifices.

The monograph is concise and to the point. The statistics are of special value, as the cases were all observed under the same conditions. Careful studies of this kind do much towards increasing our knowledge of the diseases of particular organs.

A Text-book of the Practice of Medicine. By JAMES M. ANDERS, M. D., of Philadelphia. Fourth edition. (*Philadelphia: W. B. Saunders & Co., 1900.*)

Only a year has passed since the appearance of the third edition of this work, yet Dr. Anders has made many additions and recent literature has been frequently quoted in the present one. There are some things we miss, however. Little is said of the occurrence of typhoid bacilli in the urine of typhoid-fever patients. More emphasis might have been laid on the importance of thorough disinfection of the urine. Probably more cases of direct infection of typhoid have been due to the urine than to the fæces. In discussing the treatment of pneumonia, Dr. Anders advises the giving of large doses of strychnine hypodermically, as much as one-fifteenth of a grain every two or three hours. The administration of digitalis is only advised in the event of great cardiac weakness. The experience of this hospital has been that digitalis is of more service in these cases than the tincture of digitalis.

In reviewing a text-book of medicine there are certain sections that are probably most often first referred to as an index of the author's views. Of these, possibly that on appendicitis comes first. Dr. Anders here speaks with no uncertain voice. He considers that the physician and surgeon "should stand guard together from the moment the case is diagnosticated or appendicitis is strongly suspected." The same remark might well be applied to many of the border-line conditions between medicine and surgery. He speaks for the vigorous use of salines in cases where there is peritonitis with pus-formation and operation cannot be performed.

The author still clings to elaborate tables of differential diagnosis throughout. The sections on diagnosis are good, but probably the best department is that of treatment. This is consistently good and a valuable feature of the work. There are few text-books in which this is better handled.

Atlas and Epitome of Special Pathologic Histology. Authorized translation from the German, by Docent Dr. HERMANN DURCK. Edited by LUDWIG HECTORN, M. D. With 62 colored plates. (*Philadelphia: W. B. Saunders, 925 Walnut St., 1900.*)

The first volume of this work deals with the pathological histology of the circulatory organs, respiratory organs and gastro-intestinal tract. Two more volumes are to follow. The illustrations, which naturally occupy a considerable space in the atlas, are well printed on heavy paper, but the colors are disappointing. Several of the figures, however, are very good. The text is made up of short accounts of the various pathological processes. These descriptions, of course, do not pretend to be exhaustive, but the beginner in the study of pathology will no doubt find them very useful in connection with laboratory work. The book is not an attractive one at first glance, but its concise text and numerous illustrations make it a useful addition to a laboratory.

BOOKS RECEIVED.

Transactions of the Ophthalmologic and Otolaryngologic Association, at its Fifth Annual Session, held in St. Louis, Mo., April 5, 6 and 7, 1900.

Archives of the Roentgen Ray. Edited by Thomas Moore, F. R. C. S., and Ernest Payne, M. A. (Cantab). Vol. 5, No. 1, August, 1900. 4to. Rebman, Limited, London. Queen & Co., Philadelphia.

Cancer of the Stomach. A Clinical Study. By William Osler, M. D., and Thomas McCrae, M. B. (Tor.). With illustrations. 1900. 8vo. 157 pages. P. Blakiston's Son & Co., Philadelphia.

Transactions of the Texas State Medical Association. Thirty-second annual session, held at Waco, Texas, April 24 to 27, 1900. 8vo. 400 pages. Austin, Texas.

Tuberculosis: Its Nature, Prevention and Treatment. With special reference to the Open-air Treatment of Phthisis. By Alfred Hillier, B. A., M. D., C. M. With thirty-one illustrations and three colored plates. 1900. 12mo. 12 + 243 pages. Cassell & Co., Limited, London, Paris, New York and Melbourne.

Diseases of the Gall-bladder and Bile-ducts, including Gall-stones. By A. W. Mayo Robson, F. R. C. S. Assisted by Farquhar Macrae, M. B., C. M. (Glas.). Second edition. 1900. 8vo. 313 pages. Baillière, Tindall & Cox, London.

Transactions of the Indiana State Medical Society, 1900. Fifty-first annual session, held at Anderson, Indiana, May 24 and 25, 1900. 8vo. 478 pages. Indianapolis.

Essentials of Histology. By Louis Leroy, B. S., M. D. Arranged with Questions following each chapter. 72 illustrations. (Saunders' Question-Compends, No. 25). 1900. 12mo. 231 pages. W. B. Saunders & Co., Philadelphia and London.

Index Catalogue of the Library of the Surgeon-General's Office, United States Army. Authors and Subjects. Second Series, Vol. V. Enamel-Fyuner. 1900. 4to. 1127 pages. Government Printing Office, Washington.

Guy's Hospital Reports. Edited by E. C. Perry, M. A., M. D., and W. H. A. Jacobson, M. Ch. Vol. LIV, being Vol. XXXIX of the third series. 1900. 8vo. xli + 341 pages. J. & A. Churchill, London.

Modern Medicine. By Julius L. Salinger, M. D., and Frederick J. Kalteyer, M. D. Illustrated. 1900. 8vo. 801 pages. W. B. Saunders, Philadelphia and London.

Anomalies of Refraction and of the Muscles of the Eye. By Flavel B. Tiffany, A. M., M. D. Fourth edition. 1900. 8vo. 307 pages. Hudson-Kimberly Publishing Co., Kansas City, Mo.

Sexual Debility in Man. By Frederic R. Sturgis, M. D. 1900. 8vo. 432 pages. E. B. Treat & Co., New York.

Transactions of the Association of American Physicians. Fifteenth session, held at Washington, D. C., May 1, 2 and 3, 1900. Vol. XV. 8vo. xxi + 542 pages. Printed for the Association, Philadelphia.

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